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JUNE, 1918

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THE JOURNAL OF
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ORIGINAL ARTICLES

THE PRACTICAL MEASUREMENT OF PSYCHOPATHIC BEHAVIOR[1]

H. I. GOSLINE,
CAPTAIN, M. R. C., U. S. ARMY

THE practical measurement of behavior has never been seriously attempted on a large scale in the human being. Even in the case of child psychology or of animal study, it is doubtful whether attempts made can be given more serious consideration than any other mere record of events, however well such observation may have been controlled by the conditions of the experiment. There has been a vast amount of study and record of behavior, and there is a vast amount of routine work on the behavior of the psychopathic, which can be used practically even in its crude present state. And later we may hope to perfect the crude condition of our material by persistent efforts in the right direction.

The material gained from the routine ward reports of physicians and nurses in the hospitals for the mentally incapacitated, forms a treasure of great potential value, if we have a unit of measure by which it can be integrated. I do not mean to imply that such observations can ever compare in scientific fineness with the material gained by the well controlled experiment but I do claim that this crude matter can be compared and rendered of practical value and that even the experimentally controlled material can be rendered more tangible by the application of a unit of measure which is at hand.

[1] Presented at the Meeting of the American Psychopathological Association held at Atlantic City, N. J., May 11, 1918.

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There are two sorts of unit of measure; those which measure material things and those which "measure time." The words "measure time" are purposely put in quotation marks because they contain a riddle which has never been satisfactorily solved. A quotation will serve to show the cloudy confusion which exists with regard to the idea even in the minds of the well informed, in 1909. The quotation is as follows: "So the ingenuity of man goes on measuring this earthly element of time. Laplace said that 'Time is to us the impression left on the memory by a series of events,' and that motion, and motion only, can be used in measuring it. Thus it is motion, whether of the shadow on the grass, the dropping of water or the continuous oscillations of a swinging body, which is the necessary and unvarying element in all the measurements of time."[2]

It is apparent to everyone that two concepts are confused in the mind of the writer of this quotation; the concept as to the nature of time and the concept as to how time is measured. The concept as to the method by which time is measured is clear but the real significance of the measurement, the implications of the measurement, are lost sight of.

The gist of the quotation is really centred in Laplace's concept of the nature of time, especially the "series of events" part of it. He took the "impression on the memory" to be of prime significance but later psychological research has made some improvement on this conception. According to introspective psychology[3] time is filled with a variety of sensations, the source of which is our bodily reactions. We are able to perceive the lapse of time by a special combination of sensations in which increase and decrease of tension play a role. Our perception depends on an incoming current and upon the discharge of the centrifugal system. The discharge of the centrifugal system influences the sensory process itself.

But here introspective psychology stops and we must use other tools if we would proceed. It has succeeded in more satisfactorily locating the seat of our time sense in the interplay between the primary sensory process and the kinaesthetic sensations aroused by the reaction process, but one essential factor remains in the introspective solution as in the solution of La-

[2]Science History of the Universe—Vol. VIII, Mathematics—Section on Mathematical Applications by Dr. Franz Bellinger—Current Literature Publishing Co., New York, 1909.

[3]Hugo Munsterberg—Psychology, General and Applied, p. 156. D. Appleton & Co., New York, 1914.

place: it is the "series of events" of Laplace, the "incoming current" of the introspective psychology.

The combined ideas of the central location of the time sense and of the "series of events" furnishes us the essentials of a broader concept of what time really is and this concept is better founded than ever before. We can now discount our central process and it becomes clear once and for all that it is the "series of events" which is prime. It is the motion in the world outside which is prime. And motion is nothing more nor less than a change in relative position in space. Time then becomes for the thinker only a measure of change in space.

It now becomes self-evident, also, why "motion and motion only, can be used in 'measuring time.'" The measurement of time is merely setting up a mechanical change in relative position in space by comparison with which all other changes in relative position in space can be measured.

The truth of this proposition is demonstrated nowhere better than in practical experience. A crude illustration is the placing of a crime by reference to a certain time. The effort is made to crystallize a certain setting, a certain complex of relative positions in space, which must have occurred for the crime to have been committed. The alibi is gained by proving one element in the complex of relative positions in space to be otherwise than claimed by the prosecution. And this again is done by reference to the time standard. And so, by reference to our time pieces, all the positions in the world of experience might be located at the moment the crime was committed.

An example of finer measurement is the study of the physiological process with its measurements in 1-100ths of seconds, or of the psychological process with its 1-1000ths of seconds. But the findings are the same here as they were in the crude work of the detective; there is no fundamental difference but only a quantitative difference. The physiological and the psychological experiment seeks in essence to locate the relative position in space of the elements under investigation, with reference to the conditions imposed by the experiment, and the 1-100th of a second or the 1-1000th of a second is merely the mechanical change in the relative position in space which must act as a standard of comparison.

So, from the crudest to the finest examples, time remains as the unit of comparison for the "series of events" and thus, as one sub-class of the series of events, all function must be measured

in units of time. Many other methods of comparison have been offered, chiefly in the study of mental phenomena, but none have claimed more than a few straggling followers, and in the meantime there has grown up practically a crude but healthy mass of material based upon the day as the unit. It is this material at hand which only needs polishing and finishing to become a powerful tool in our attack upon the intricacies of the psychopathic mind.

In all State Hospitals which have become more than asylums in deed as well as in name, there are notes made periodically on the mental condition of each patient. This work is supplemented in our best Hospitals by the institution of a sort of conduct chart which is a daily record of the abnormal behavior of each patient. This chart is kept by the nurse on the ward and is turned in with the rest of the patient's records when he is discharged from the Hospital. This is a crude but practical method of recording conduct on a large scale and it is a fundamentally correct method, however crude, because it has a time element for comparison, namely the day. What needs polishing is our conception of the acts that really constitute abnormal behavior and secondly, the training which we mental internists give our nurses.

We must submit to a bit of self-discipline in order to be able to know when an act is abnormal and to a great deal more than a bit of self-discipline in order to tell what is really behavior and what in behavior contains elements of interpretation. We must know these differences so well that we can teach them to our nurses in simple language.

In determining the abnormal nature of a certain incident of behavior, one deals with durations, intensities, and discrepancies between cause and effect. In determining what is really behavior, one must keep in mind the two degrees of observation, the first degree taking cognizance only of the objective symptom and the second degree introducing an element of interpretation into the act of the patient as seen by the observer. The first degree of observation is the only one to be relied upon in making an evaluation of an act, because it takes the objective symptom without any element of interpretation.[4] Present conduct charts are imperfect without exception because they ignore this difference and hence they do not bring back a true report of the be-

[4]Harold I. Gosline—The Conduct of the Insane—J. Abn. Psychol.—Vol. XII, No. 4, p. 240, October, 1917.

havior of the patient and, what is of greater import, they cloud the vision of the observer, the nurse, by forcing her to interpret the acts of the patient. We can not over-emphasize the value of the nurse in this work. Her work is essential because it is practical and it will become more practical when the necessary instruction is added to the curriculum of the nurse in the mental hospital, to replace what is now taught of the groupings of mental disease. These groupings of mental disease are too complicated and too incomprehensible to the average mental nurse; they are more fitted to the work of the doctor. On the other hand, the study of behavior, if direct observation is taught, can become easy of comprehension and is a fit object for the report of the nurse.

Who in general medicine would think of attempting to teach the intricacies of the nephroses or the vagaries of the neurocardiac asthenia to his nurses? It is just as little good sense to try to teach mental nurses the uncertainties of the differential diagnosis between manic-depressive psychosis and dementia precox. Substitute something practical and more tangible to the humbler understanding.

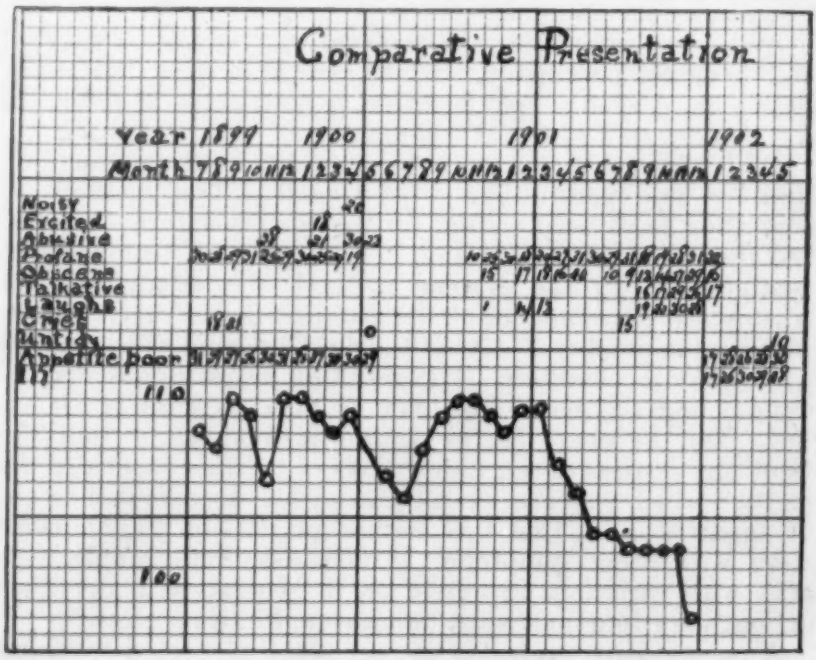
And so to summarize the problem of "measuring psychopathic behavior practically," let us recapitulate—a time unit, a clear idea of what is psychopathic, a description of behavior, and a nurse with a practical training.

With these elements we may present the results tangibly, accurately, and practically. (See Chart) Two methods of presentation have been chosen for the time being; one may be called the "graphic presentation," the other the "comparative presentation." In the graphic method of presentation, the ordinates are the numbers of the months of the year, the abscissae are the number of days of the month during which a given act of behavior persisted. The resulting graph represents the symptom under observation. Let us take restlessness for example. On the chart (upper figure) it is apparent that the patient was restless during thirty days of the first month of the year 1898 which was the second year of her disease; and so on. It is apparent, also, that this method permits of graphic comparison with other symptoms, as noisiness, for example, (see chart), with variations in weight or, in general, with any other function, since functions must be measured in time units.

A comparative presentation may also be effected by using numbers instead of the graph. (Chart, lower part). Thus

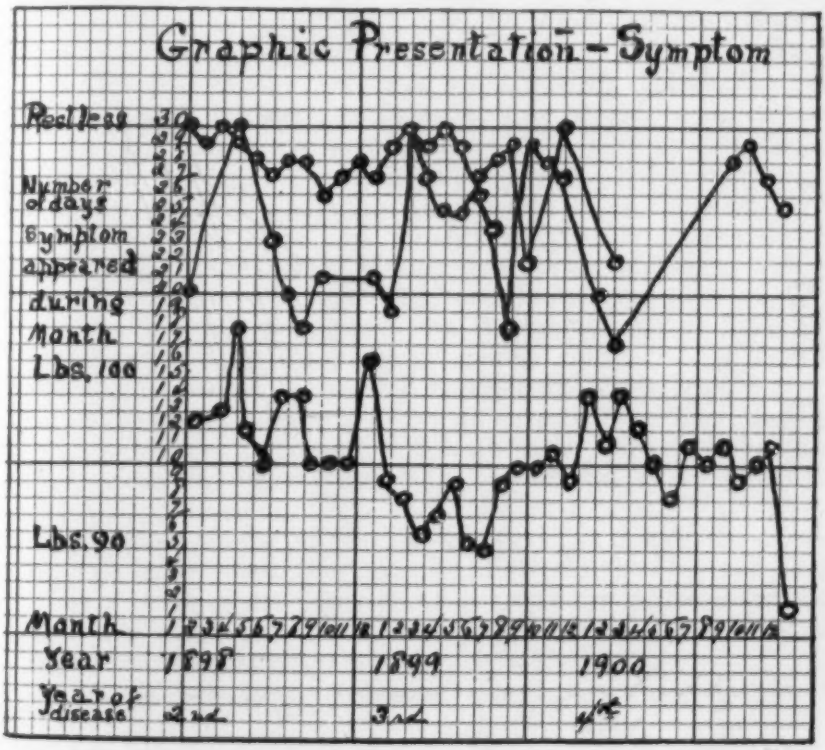
larger groups of symptoms may be compared at once or the symptoms may be compared in the various psychoses or the same symptom may be studied in a series of individuals. The method is bound only by the limitation inherent in comparisons which are referable to time as a standard.

The closer we approach the ideals outlined above, the nearer do we come to an actual measurement of neuromuscular excitement involved in the act of behavior under observation. Of course, it is not to be expected that this observation of behavior is giving us any insight into which side of the reflex arc is suffering. Such information must be obtained by the mental examination proper or by a study of the physical condition of the patient. But what we do obtain is an exact idea of the segments of the brain and cord which are discharging and, of still more value, we know something of the comparative activity of the various segments. Thus, in the lower part of the chart, it was the neuromuscular apparatus subserving the voice which was most active during the fourth month of 1900 and this took the direction of abusiveness and profanity. At another time it was the lachry-



mal apparatus plus the voice in profanity. And the entire course of this patient's behavior was exteriorized in the head segments of the cord or, perhaps, in the head area of the brain except at the end of the disease when the activity of these segments subsided and the lower segments of the cord, or the upper areas of the brain, or possibly areas in the thalamus, became active, as evidenced in the patient's untidiness. At the same time the gastro-intestinal system was upset.

In concluding, it may be emphasized again that the method is practical now and can be made more so. An example of the interpretation of the figures and how to compile the figures has been given. The method is not new; it is only an extension of what is being done now in Hospitals for the insane where scientific work is being attempted. The adoption of this method makes for clear thinking by insisting on a clear comprehension of real differences which exist between behavior in the true sense and



what is often erroneously termed behavior. Finally, it is a step in a rational plan of psychoanalysis; the sort of psychoanalysis that is trying to arrive at the seat of the patient's trouble in his own body.

Just now we must be content to leave it to future researches to reveal the total possibilities of discharge of the sensory system into the paths observed to be acting when we study behavior. But with the advent of this knowledge, we shall locate the seat of the pathological condition in the mental case from the symptoms, in the same ideal way attempted, but never quite reached, by our confreres in general medicine.

HYPNAGOGIC HALLUCINATIONS WITH CASES ILLUSTRATING THESE SANE MANIFESTATIONS[1]

N. S. YAWGER, M. D., PHILADELPHIA

IN medical writings it is seldom that more than mention is made of sane hallucinations, though they are not of such uncommon occurrence and occasionally we are consulted as to their significance. From Bible-times down there always have been persons who beheld visions and history records many instances where men of genius have had either a single hallucinatory experience or have been subject to their occasional reappearance.

Hypnagogic phenomena were first studied and so named by the French psychologist, Maury (1); subsequently, the matter was given consideration by Kraepelin (2), and in this country it is mentioned by White (3) but for the most part the subject has been left to psychologists.

These curious experiences are familiarly known as visions, and, though innocent in their nature, might be mistaken as heralding some grave mental disorder. In discussing the subject some writers have included phenomena of the special senses manifested upon wakening; the derivation of the word hypnagogic prohibits this, and, furthermore, while experiences preceding sleep are mostly visual, those occurring upon wakening are more likely to be associated with hearing.

By hypnagogic phenomena, hallucinations or visions, we understand those experiences, usually optical, of a few sane persons, observed during the transitional stage from wakening to slumber and in which scenes or objects of various kinds pass rapidly before the sight. While in some individuals such hallucinations are observed with the eyes closed, in others they are seen with them open.

The character of the visions vary; at times they assume architectural forms, they may be of streets or of interior decorations and in other experiences persons are represented either singly or in groups. These recurring scenes are likely to be more or less of a similar character in each individual.

[1]Read before the American Neurological Association at the Forty-fourth Annual Meeting, Atlantic City, May, 1 18.

Case 1. A female, aged 72, long a sufferer from chronic rheumatic arthritis but whose hallucinatory experiences antedates her invalidism. The visions were first manifested at 40 years, since then not oftener than once in two or three years and still less often of recent years. The sights appear only upon retiring and always with the eyes closed. They are of no particular type—Scenes from nature, different patterns of lace and sometimes human heads with distorted features. Once, this individual recalls seeing a castle with doors standing open. It appeared to her that she entered the structure and walked along a wide corridor and into a number of large vacant rooms.

Case 11. This is of a gentlewoman, aged 47, of unusual intelligence and in exceptional health. Her own statement follows: The visions appeared first at about 15 years and have been continuous ever since at longer or shorter intervals. Sometimes they appear for several consecutive nights and then remain away for months at a time.

So far as I can judge they are not more likely to be with me when I am overtired or disturbed in mind. I exercise no control over them as I have repeatedly endeavored to recall the sights but without success; again, when I least expect them they appear, though never until after having retired. In character they are panoramic, one scene appearing for a few seconds to be followed a moment later by a vision entirely different. I regard their development with great interest and enjoyment. At times when others have been in my rooms I have been pleased to entertain them with descriptions of these visions as they appeared one by one. Though my eyes are closed, I know I am fully awake, else how could I describe the sights accurately at the time and furthermore have the power of recalling them long after?

My experiences are almost invariably of a pleasant nature and through many years there have been but few instances when I have met with decidedly unpleasant sights. These experiences are not the projected images of things previously seen or read but seem an entirely new creation. To me a singular feature is that the visions are invariably void of life—Never a living creature nor the image of one—All is so deserted and still.

As to the subjects of these visions: They are sceneries from nature of various kinds, streets where I see rows of houses mostly of dark brown sandstone and of stately architecture, handsome rooms with beautiful furnishings and hangings, all of

gorgeous hue and wondrous design. When I distinctly see interiors, patterns of tapestries and decorations, they are usually in oriental style. Most all I see is so beautiful that I long for the power to reproduce it in reality.

Once, I vividly recall that suddenly there appeared lying upon a highly polished round-top table of about two feet in diameter and within easy reach of my hand, a jewel, of oval shape and about four inches in its greatest length. This jewel was a most beautiful, rich, shining topaz, set in a golden scroll and in the center was a jet-black pulsating star. Soon the whole scene vanished from my sight.

More frequent but less elaborate experiences are with me as I waken. These are usually associated with hearing and consist for the most part of jabbering, incoherent words or snatches from sentences. A recent instance of this kind was my distinctly catching these words, "I paid my million dollar debt to E. P. Andre." To me these words are always meaningless since I can associate them with nothing in my past life.

In the latter case cited the visions began at 15 years and in the former at 40. This, according to Steen (4), is unusual. In speaking of such manifestations he says, "These are more marked in youth and as a rule disappear when adult life is reached." He quotes DeQuincy who wrote, "I know not whether my reader is aware that many children have a power as it were of painting upon the darkness all sorts of phantoms; in some that power is simply a mechanical affection of the eye; others have a voluntary or semi-voluntary power to dismiss or summon such phantoms; or, as a child once said to me when I questioned him about this matter, 'I can tell them to go, and they go, but sometimes they come when I don't tell them to come.' "

These manifestations do not have their origin in peripheral disturbances, they have been perceived in persons blind and deaf. Individuals having such experiences may be physically healthy and entirely sane. The phenomenon is just a state of mind and probably as far removed from disease or disorder as is dreaming.

One finds among psychologists various theories accounting for hypnagogic hallucinations. In some general discussion of analogous states James says, "Whenever the associative processes are reduced and impelled by the approach of unconsciousness, as in falling sleep, or growing faint or in becoming

narcotized, we find a concomitant increase in the intensity of whatsoever partial consciousness may remain."

As to theories regarding hypnagogic phenomena—Some have considered them due to shutting off the drainage through association paths, thereby making more intense the activity of those cells that retain any activity, until finally the accumulation is so great that a sensory explosion occurs in the form of a vision.

Another theory lays stress upon the approach of drowsiness, at which time the sensations cease, consequently, we have an absence of their reductive power; in other words, the channels of comparison being shut off, there is in operation no toning down process and thus the imaginary sights are permitted to spring into existence unopposed.

1. Maury, L. F. Alfred: Le Sommeil et les Reves; Libraire Academeque et Cie, Libraires-Editeurs, Paris, 1861, p. 41.
2. Kraepelin, Emil: Psychiatrie; Johann Ambrosius Barth, Leipzig; 1. Band, p. 130, 1903.
3. White, William A.: Outlines of Psychiatry; Nervous and Mental Disease Publishing Company, Washington; 1918, p. 45.
4. Steen, Robert Hunter: Hallucinations in the Sane; The Journal of Mental Disease; July, 1917, p. 328.
5. James, William: Psychology, Henry Holt and Company, New York: Vol. II, 1890, p. 124.

POINT SCALE EXAMINATIONS[1] ON THE HIGH-GRADE FEEBLE-MINDED AND THE INSANE

BY JOSEPHINE N. CURTIS, PH. D.

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IN February, 1916, when we began the investigation here reported,[2] to our knowledge no extensive use of the Yerkes-Bridges Child (pre-adolescent) Point Scale had been made with subjects at the border-line of feeble-mindedness.[3] We were concerned to determine as accurately as possible the intellectual level reached by individuals who had proven that they were just unable to get along by themselves in the world, and to ascertain for these cases the range of variation in intellectual ability. We wished, secondly, to obtain data for comparison with ratings already obtained on the same subjects by the use of the Goddard 1911 revision of the Binet tests,[4] and to ascertain the diagnostic significance, at the upper ages of the individual tests on the Point Scale. As work progressed, it became increasingly evident that the child scale was unsuitable for our purposes in some cases, since with it our highest grade subjects attained scores equal to those of normal subjects. This outcome indicated that not enough difficult tests were included in the scale to give chances for the subnormals to display their inferiority. Accordingly we gave the preliminary form of the Yerkes-Rossy Adult Point Scale[5] to about thirty subjects who received high scores on the child scale.

Our subjects were 100 boys and 100 girls at the Massachusetts School for the Feeble-Minded at Waverley. There are

[1]The directions for grading given by Yerkes, Bridges, and Hardwick, *A Point Scale for Measuring Mental Ability*, 1915, proved too meagre for our work and we have therefore made a more detailed list of typical answers and their evaluation. This list is now in use in the Psychopathic Hospital, Boston and is given in Appendix B of this paper.

[2]The problem of the applicability of the Point Scale to the high grade feeble-minded was suggested by Major R. M. Yerkes. To him, to Dr. W. E. Fernald and Dr. F. Mateer of Waverley and to Dr. E. E. Southard of the Psychopathic Hospital grateful acknowledgments are due for valuable suggestions and criticisms.

[3]The report of T. H. Haines, *Ohio Board of Administration, Pub.* 7, Dec. 1915 had not reached us. Compare also R. M. Yerkes and L. Wood, *Journ. Ed. Psych.* 7, Dec., 1916.

[4]H. H. Goddard, reprint (1911) from Training School, January, 1910.

[5]A brief account of the nature of this scale and of our results with it are given by R. M. Yerkes and C. S. Rossy, *Boston Med. and Surg. Journ.* 176, No. 16, April 19, 1917, p. 569 ff. Certain other results follow in this paper.

no spastics, Cretins, Mongolians, microcephalics or hydrocephalics in the group. Negroes are designated in the tables by parentheses. With scarcely any exceptions our group contained all of the high grade girls at the school. There are 68 whose mental ages are 9 or over.[6] Most of the high grade boys at the school were also examined, though some few could not well be taken from their work on the farm. Our cases, however, included 70 boys of 9 years mental age and over. For the rest, the groups are made up chiefly of boys and girls of slightly lower mental ages whom it was necessary to examine to make sure they were really below 9, together with a few at much lower ages for the sake of certain comparisons. The median chronological age of the boys examined was 16 + a median variation of 2; of the girls, 24 +3. The median chronological age of the 70 high grade boys was 16 2; of the 68 high grade girls, 24 +4. All of the cases had been tested at the school less than two years before by Goddard's revision of the Binet tests. The following facts make it probable that for many purposes we may make comparisons between the results of the two scales without significant errors due to lapse of time between the giving of the two sets of tests: 1) The median chronological ages of our lower grade and of our higher grade groups are identical. 2) The Binet measurements give 65 boys and 70 girls with mental age over 9 as compared with 70 and 68 by the Point Scale. 3) Many of our group are adults and therefore probably not developing.

TABLE I

POINT SCALE AND BINET DATA UPON 200 FEEBLE-MINDED BOYS

CHILD POINT SCALE—MENTAL AGE

Case number	Chronological age	Child Point Scale mental age			Binet mental age	I. Q.			Point Scale mental age–Binet mental age	Adult Point Scale Score
		score	old norms	new norms		C. I.	Point Scale	Binet		
1	22	21	4.8	4.9	6.6	24	31	41	−1.7	
2	17	29	6.0	6.2	7.6	34	38	48	−1.4	
3	24	32	6.5	6.6	6.4	36	41	40	.2	
4	15	36	7.2	7.2	7.0	45	48	47	.2	
5	10	38	7.5	7.5	8.2	67	75	82	−.7	

[6]Except when otherwise indicated, the corrected norms of Yerkes and Wood, *op. cit.*, 606, are used in all computation in this paper.

6	11.5	39	7.7	7.6	7.2	58	65	63	.4
7	15	40	7.8	7.7	8.2	49	51	48	.5
8	10	40	7.8	7.7	9.0	70	77	90	−1.3
9	20	40	7.8	7.7	8.6	45	48	54	−.9
10	17	41	8.0	7.8	7.0	48	49	44	.8
11	16	42	8.1	8.0	7.8	50	51	49	.2
12	22	42	8.1	8.1	7.8	49	51	49	.3
13	11.9	44	8.2	8.2	7.8	69	69	66	.4
14	18	44	8.2	8.2	9.0	50	51	56	−.8
15	14	44	8.2	8.2	9.4	56	58	57	−1.2
16	11.2	44	8.2	8.2	8.0	68	73	71	.2
17	29	44	8.2	8.2	9.0	50	51	56	−.8
18	17	45	8.3	8.4	9.0	52	52	56	−.6
19	10.7	45	8.3	8.4	8.0	73	78	75	−.4
20	12.1	46	8.3	8.5	9.2	66	70	76	−.7
(21)	16	46	8.3	8.5	7.0	55	53	44	1.5
22	15	47	8.4	8.6	8.4	57	57	56	.2
23	11.5	48	8.5	8.8	8.2	72	76	71	.6
24	14.2	48	8.5	8.8	8.2	61	62	58	.6
25	20	48	8.5	8.8	9.0	55	55	56	−.2
26	33	48	8.5	8.8	8.2	55	55	51	.6
27	17	48	8.5	8.8	10.0	56	55	63	−1.2
28	14.5	49	8.5	8.9	9.2	61	61	63	−.3
29	15	49	8.5	8.9	8.0	61	59	53	.9
30	12	49	8.5	8.9	9.8	70	74	82	−.9
(31)	14	50	8.6	9.0	10.0	64	64	71	−1.0
32	13.7	50	8.6	9.0	9.0	65	66	66	0
(33)	19	50	8.6	9.0	8.0	57	56	50	1.0
34	21	50	8.6	9.0	9.4	57	56	59	−.4
35	16	51	8.7	9.2	8.2	61	58	51	1.0
36	15	51	8.7	9.2	8.0	61	57	53	1.2
37	15	51	8.7	9.2	8.6	63	61	57	.6
38	14.5	51	8.7	9.2	8.0	64	63	55	1.2
39	15	51	8.7	9.2	9.6	62	61	64	−.4
40	17	51	8.7	9.2	9.4	61	57	59	−.2
41	13.7	52	8.7	9.3	8.0	63	63	58	1.3
42	17	52	8.7	9.3	9.2	60	58	58	.1
(43)	16	52	8.7	9.3	9.4	63	60	59	−.1
44	15	52	8.7	9.3	9.2	63	61	61	.1
45	14.7	52	8.7	9.3	8.0	64	63	54	1.3
46	12.5	53	8.8	9.5	9.6	74	76	77	−.1
47	16	53	8.8	9.5	8.4	63	59	53	1.1
(48)	13.5	53	8.8	9.5	9.2	70	70	68	.3
49	10.3	53	8.8	9.5	8.2	90	92	80	1.3
(50)	21	55	8.9	9.7	8.6	63	61	54	1.1
51	13	54	8.9	9.6	9.4	73	74	72	.2
52	17	55	8.9	9.7	9.8	64	61	61	−.1
53	15	55	8.9	9.7	9.2	63	65	61	.5
54	23	55	8.9	9.7	9.6	63	61	60	.1
55	31	55	8.9	9.7	8.8	63	61	55	.9

56	11.4	56	9.0	9.9	8.6	85	87	75	1.3
57	45	56	9.0	9.9	9.0	64	62	56	.9
58	23	57	9.2	10.0	10.6	65	63	66	−.6
59	16	57	9.2	10.0	10.2	68	63	64	−.2
60	17	57	9.2	10.0	9.4	66	63	59	.6
61	12	58	9.3	10.1	9.6	83	84	80	.5
62	15	58	9.3	10.1	9.2	72	67	61	.9
63	16	58	9.3	10.1	8.6	69	63	54	1.5
64	15	58	9.3	10.1	9.0	72	67	60	1.1
65	18	58	9.3	10.1	10.2	66	63	64	−.1
66	40	58	9.3	10.1	9.0	66	63	56	1.1
67	18	59	9.5	10.3	10.0	67	64	63	.3
68	14.5	59	9.5	10.3	9.0	74	71	62	1.3
69	18	60	9.7	10.4	10.2	68	65	64	.2
70	20	60	9.7	10.4	8.8	68	65	55	1.6
71	17	60	9.7	10.4	9.0	70	65	56	1.4
72	11.9	60	9.7	10.4	8.2	82	87	69	2.2
73	15	60	9.7	10.4	9.2	74	69	61	1.2
74	14	61	9.8	10.5	10.0	73	75	71	.5
(75)	12	61	9.8	10.5	10.0	87	88	83	.5
76	27	61	9.8	10.5	10.0	69	66	63	.5
77	15	61	9.8	10.5	9.8	75	70	65	.7
78	16	63	10.3	10.8	10.2	75	68	64	.6
(79)	17	63	10.3	10.8	9.2	73	68	58	1.6
80	19	64	10.7	11.0	10.6	73	69	66	.4
81	20	64	10.7	11.0	9.8	74	69	61	1.2
82	15	64	10.7	11.0	9.4	79	73	63	1.6
83	20	65	11.0	11.2	10.4	74	70	65	.8
84	23	65	11.0	11.2	9.4	74	70	59	1.8
85	18	65	11.0	11.2	10.2	74	70	64	1.0
86	16	65	11.0	11.2	10.0	77	70	63	1.2
87	15	67	11.2	11.5	9.4	83	77	63	2.1
88	16	68	11.3	11.7	11.2	81	73	63	.5
89	21	68	11.3	11.7	10.8	77	73	70	.9
90	14	70	11.4	12.1	10.6	90	86	68	1.5
91	15	70	11.4	12.1	10.2	86	81	68	1.9
92	13.5	70	11.4	12.1	9.2	92	90	68	2.9
(93)	17	72	11.6	12.5	9.4	84	78	59	3.1
(94)	18	72	11.6	12.5	10.4	82	78	65	2.1
95	17	75	11.8	13.2	10.0	87	82	63	3.2
96	14	75	11.8	13.2	11.0	96	94	79	2.2
97	16	79	13.0	14.2	10.6	94	89	66	3.6
98	17	81	14.0	14.9	10.0	94	93	63	4.9
99	16	82	15.0	15.2	10.4	98	95	65	4.8
100	18	93	15. +	18. +	12.0	106	113	75	6.0+

GIRLS

101	23	22	5.0	5.0	6.4	25	31	40	−1.4
102	15	25	5.4	5.5	5.8	25	37	39	−.3
103	13	27	5.7	5.9	6.6	27	38	51	−.7
104	23	27	5.7	5.9	7.2	31	37	45	−1.3
105	32	28	5.9	6.0	6.8	32	38	43	−.8
106	19	28	5.9	6.0	6.8	32	38	43	−.8
107	33	28	5.9	6.0	7.4	32	38	46	−1.4
108	29	30	6.2	6.3	7.8	34	39	49	−1.5
109	21	33	6.8	6.8	7.6	38	43	48	−.8
110	26	33	6.8	6.8	8.8	38	43	55	−2.0
111	26	34	6.8	6.9	8.4	39	43	53	−1.5
112	24	35	7.0	7.0	8.2	40	44	51	−1.2
113	24	35	7.0	7.0	8.6	40	44	54	−1.6
114	20	36	7.2	7.2	6.8	41	45	43	.4
115	49	38	7.5	7.5	9.0	43	47	56	−1.5
116	24	39	7.7	7.6	7.8	44	48	49	−.2
117	25	39	7.7	7.6	8.4	44	48	53	−.8
118	26	39	7.7	7.6	8.4	44	48	53	−.8
119	19	40	7.8	7.7	8.4	45	48	53	−.7
120	25	40	7.8	7.7	7.0	45	48	44	.7
121	27	43	8.1	8.1	7.3	49	51	45	.9
122	34	43	8.1	8.1	8.4	49	51	53	−.3
123	23	43	8.1	8.1	8.0	49	51	50	.1
124	36	45	8.3	8.4	9.6	51	53	60	−1.2
125	14	47	8.4	8.6	7.8	54	54	49	.8
126	57	47	8.4	8.6	8.6	54	54	54	0
127	20	47	8.4	8.6	9.0	54	54	56	−.4
128	25	47	8.4	8.6	8.2	54	54	51	.4
129	20	47	8.4	8.6	9.0	54	54	56	−.4
130	26	48	8.5	8.8	7.8	55	55	49	1.0
131	21	48	8.5	8.8	9.6	55	55	60	−.8
132	26	49	8.5	8.9	9.6	56	56	60	−.7
133	28	50	8.6	9.0	9.0	57	56	56	0
134	21	50	8.6	9.0	8.8	57	56	55	.2
135	18	50	8.6	9.0	9.2	57	56	58	−.2
(136)	19	52	8.7	9.3	8.2	59	58	51	1.1
137	27	54	8.9	9.6	10.2	61	60	64	−.6
138	16	55	8.9	9.7	10.4	65	61	65	−.7
139	33	55	8.9	9.7	10.2	63	61	64	−.5
140	21	57	9.2	10.0	10.6	65	63	66	−.6
141	24	57	9.2	10.0	8.6	65	63	54	1.4
142	26	58	9.3	10.1	10.2	66	63	64	−.1
143	26	58	9.3	10.1	10.0	66	63	63	.1
144	19	58	9.3	10.1	9.6	66	63	60	.5
145	30	58	9.3	10.1	10.0	66	63	63	.1
146	27	59	9.5	10.3	9.8	67	64	61	.5
147	20	59	9.5	10.3	9.8	67	64	61	.5
148	25	60	9.7	10.4	9.0	68	65	56	1.4
149	35	60	9.7	10.4	9.2	68	65	68	1.2

150	29	60	9.7	10.4	9.0	68	65	56	1.4	
151	17	61	9.8	10.5	10.4	76	66	65	.1	
152	22	61	9.8	10.5	10.0	69	66	63	.5	
153	30	62	10.0	10.7	9.8	70	67	61	.9	20
154	13.2	62	10.0	10.7	10.4	83	81	79	.3	
155	32	62	10.0	10.7	9.6	70	67	60	1.1	
156	26	63	10.3	10.8	9.0	72	68	56	1.8	
157	25	63	10.3	10.8	9.2	72	68	58	1.6	
158	24	65	11.0	11.2	10.2	74	70	64	1.0	29
159	31	66	11.1	11.4	9.8	75	71	61	1.6	
160	24	66	11.1	11.4	9.4	75	71	59	2.0	
161	21	67	11.2	11.5	10.2	76	72	64	1.3	
162	32	67	11.2	11.5	10.4	76	72	65	1.1	
163	28	67	11.2	11.5	10.2	76	72	64	1.3	29
164	31	68	11.3	11.7	10.6	77	73	66	1.1	
165	39	68	11.3	11.7	8.6	77	73	54	3.1	
166	37	68	11.3	11.7	10.0	77	73	63	1.7	18
167	23	68	11.3	11.7	11.0	77	73	69	.7	
168	16	69	11.3	11.9	10.2	82	74	64	1.7	
169	25	69	11.3	11.9	10.0	78	74	63	1.9	32
170	24	70	11.4	12.1	11.2	80	76	70	1.1	32
171	27	70	11.4	12.1	10.8	80	76	68	1.3	
172	19	71	11.5	12.3	11.0	81	77	69	1.3	26
173	22	72	11.6	12.5	11.0	82	78	69	1.5	
174	31	72	11.6	12.5	10.6	82	78	66	1.9	26
175	20	72	11.6	12.5	10.6	82	78	66	1.9	33
176	23	72	11.6	12.5	10.6	82	78	66	1.9	40
177	21	73	11.7	12.8	10.2	83	80	64	2.6	28
178	29	73	11.7	12.8	11.0	83	80	69	1.7	36
179	26	73	11.7	12.8	10.6	83	80	66	2.2	41
180	24	73	11.7	12.8	10.2	83	80	64	2.6	40
181	17	74	11.8	13.0	10.6	85	81	66	2.4	41
182	15.9	77	12.0	13.7	9.2	93	86	58	4.5	32
183	21	77	12.0	13.7	9.2	88	86	58	4.5	42
184	22	79	13.0	14.2	11.2	90	89	70	3.0	42
185	25	79	13.0	14.2	11.2	90	89	70	3.0	40
186	27	79	13.0	14.2	10.6	90	89	66	3.6	27
187	25	80	13.5	14.5	11.2	91	90	70	3.3	54
188	27	80	13.5	14.5	11.6	91	90	73	2.9	32
189	32	82	15.0	15.2	11.0	93	95	69	4.2	56
190	20	83	15.5	15.5	10.6	94	97	66	4.9	52
191	17	83	15.5	15.5	11.2	98	97	70	4.3	47
192	17	83	15.5	15.5	10.4	98	97	65	5.1	49
193	26	84	16.0	16.0	11.4	97	100	71	4.6	41
194	16.8	84	16.0	16.0	11.0	98	100	69	5.0	59
(195)	20	85	16.5	16.3	10.4	97	102	65	6.1	47
196	33	85	16.5	16.3	10.8	97	102	68	5.5	
197	21	86	17.0	16.8	11.6	98	105	72	5.2	47
198	27	89	18.+	18.+	11.2	101	113	70	6.8+	44
199	22	89	18.+	18.+	11.4	101	113	71	6.6+	45
200	19	92	18.+	18.+	11.4	105	113	71	6.6+	54

Table I presents our data. In the succeeding columns are given: 1) case number; 2) chronological age; 3) the Child Point Scale score (total credits); 4) the mental age corresponding to the score, according to original norms;[7] 5) the mental age using corrected norms; 6) the Binet mental age; 7) the coefficient of intelligence (attained Point Scale score divided by score expected at chronological age, adults 88 points, 18 years); 8) the Point Scale Intelligence quotient (Point Scale mental age divided by chronological age, adults given age 16); 9) the Binet I Q (adult, 16 years); 10) the difference between the Point Scale age and the Binet age; 11) the Adult Point Scale score.

That the distribution of cases by mental age is noticeably different, according to whether old or new norms are used is evident from the summary given by Table II where with change from old to new norms the mode of the total distribution moves two years upward, 8.0-8.9 to 10.0-10.9.

TABLE II

DISTRIBUTION OF CASES AT VARIOUS MENTAL AGES

	4.0–4.9	5.0–5.9	6.0–6.9	7.0–7.9	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9
Point Scale:								
Old norms	1	7	6	15	65	35	10	38
New norms	1	4	9	16	32	34	40	22
Binet	0	1	7	18	39	61	54	19

	12.0–12.9	13.0–13.9	14.0–14.9	15.0–15.9 (or 15+)	16.0–16.9	17.0–17.9	18.0+
Point Scale:							
Old norms	2	6	1	14			
New norms	16	5	7	5	5	0	4
Binet	1						

There is no selective factor known to the institution authorities which would explain the relatively small number of cases at 10.0-10.9 (old norms). The distribution of the cases by Binet ages shows no evidence of a gap at or near this age. The gap appears, therefore, to be due to the incorrectness of the older norms, and our finding that this gap disappears when new

[7]See R. M. Yerkes, J. W. Bridges, and R. S. Hardwick, *A Point Scale for Measuring Mental Ability*, p.

norms are used may be considered a further justification for the use of the new norms at this and the adjacent ages.

Forty-two cases with mental ages above 12 (11 boys and 31 girls, 16% and 46%, respectively, of the high grade groups) is a surprisingly large number. In the case of the girls particularly, however, it should be noted that probably about half of those over 9 mentally would not have found themselves in the institution had it not been for delinquencies. Seven of the 31 girls have definite histories of delinquency. One also is probably psychotic. Another, a negress who has since died, had the appearance of a white girl. In consequence she was forced when outside the institution to compete with white requirements. She would not under more natural requirements have been called feeble-minded. Of the 22 other girls, 2 have been discharged, and 5 are out on trial. So far as known they are doing well under supervision. The remaining 15 are still at the school. Of the 11 boys, 3 have been discharged. One of these is now diagnosed as not feeble-minded. Two others, one of whom is diagnosed probably psychotic, have run away. Of the rest, one is temporarily released, one has just been allowed to leave on trial, one has been on trial but has been returned unsuccessful, and 3 are still at the institution. Thirteen of these cases, then, either can be diagnosed as not feeble-minded, or are proving that they can get along outside the institution if under supervision. Of the remaining 29 cases, 7 are delinquent, and very likely emotionally rather than intellectually defective, leaving the cases unquestioned, 22. The probability is that with increasing years a few more will be discharged or let out on trial. We may then say that there are about 20 cases in our group who are considered feeble-minded, and who give a mental age of over 12. Since our work was done, many more children who do not belong to the delinquent group and who have mental ages over 12 have been admitted to the school. It is therefore dangerous to say that all persons over 12 years mental age are thereby indicated as not truly feeble-minded. It is also dangerous to say that no person in a School for the Feeble-minded will ever be able to get along by himself in the world

COMPARISON OF THE C I AND THE I Q

The diagnostic value of the coefficient of intelligence and of the intelligence quotient, as compared with that of the mental age, have of late been emphasized. The coefficient of intelli-

gence (C I) of .70 has been placed tentatively as the "upper limit of inadequacy or inferiority" below which individuals are "socially burdensome, ineffective and usually a menace to social welfare," and .70 to .80 intelligence quotient (I Q) is regarded as characterizing "borderline deficiency, often classifiable as feeble-mindedness" and below .70 I Q as "definite feeble-mindedness."[8]

We give in Table III the distribution of the C I's and I Q's for our groups.

TABLE III

DISTRIBUTION OF CASES BY C I AND BY I Q

	C I (adult 88 points)			I Q (adult 16 years)		
	Boys	Girls	Total	Boys	Girls	Total
21-30	1	3	4	0	0	0
31-40	3	10	13	2	8	10
41-50	8	10	18	4	12	16
51-60	15	13	28	21	17	38
61-70	31	17	48	43	20	68
71-80	24	16	40	16	22	38
81-90	12	16	28	9	9	18
91-100	5	12	17	4	6	10
101-	1	3	4	1	6	7

From Table III it is evident that the use of the C I gives a greater number of high grades than does the I Q (89 vs. 73 cases above .70). Indeed, according to the C I rating, 21 cases are classifiable as normal or supernormal,[9] 68 as subnormal, and only 111 cases have the low intelligence of the feeble-minded. If we use the I Q, we find 127 with the intelligence of the feeble-minded, and 38 more who are probably feeble-minded, 18 who are dull and probably not feeble-minded, and 17 who have normal intelligence. We have suggested above (p. 00) that some of the children at the school (perhaps 22) may be classed above the feeble-minded grade. This leaves at least 178 of our group who are considered by the authorities at the school as definitely feeble-minded.

[8] For use of the C I see R. M. Yerkes and L. M. Wood, *op. cit.*, pp. 602, 606. For use of the I Q, see L. M. Terman, *Measurement of Intelligence*, 1916, pp. 79, 87ff.

[9] See Yerkes and Wood, *op. cit.*, p. 601.

The I Q expresses this fact more truly than does the C I. Moreover, if we should accept a .70 C I as the limit of feeble-mindedness this would imply a score of 62 and a mental age of 10.0 as critical in adults. This limit is evidently, therefore, far too low.

From a theoretical point of view there seem to be a number of arguments in favor of the I Q. In the first place there are more chances of error in the use of the C I than there are in that of the I Q. Dr. Yerkes has pointed out[10] that "The reliability of the quotient depends upon several variable factors, important among which are the accuracy of the measurement of intelligence, and the trustworthiness of chronological age." This must also hold true for the C I. The question of chronological age makes one error in the I Q, that is, it may change the divisor; but it makes two errors in the C I: first, the given age may be wrong; second, the number of points corresponding to that age may be wrong.

The fact that the gaining of a point at the higher ages means very little so far as the C I is concerned ($\frac{17}{18}$ and $\frac{18}{19}$ at 18 show the slight difference .01 while $\frac{4}{5}$ and $\frac{5}{6}$ at 5 show the much larger difference .05) together with greater probability of more points difference at 5 implies that individuals are much more alike in intelligence at 18 than the same individuals were at 5. This difference has been noticed by Yerkes and Wood who state[11] that this outcome is justified by application of the scale. "The results make it appear that extraordinary intellectual ability is fairly common up to 8 years, and then becomes very uncommon." It would seem that any results which make any such astonishing statement seem true, must be questionable. The authors, to be sure, state that "Evidently . . . the reliability of our coefficient and its value for purposes of comparison are conditioned by characteristics of range." Now if the C I is to mean different things at different ages, then it has the fault that is found with the statement of difference between chronological and mental ages, namely that a retardation of 2 years at chronological age 5 is more serious than a retardation of 2 years at chronological age 12. Yerkes and Wood also note that they would not have predicted Terman's steadiness of I Q. The reason for this statement is not clear. If intelligence is ability to get along, to compete on equal terms with others of the given chronological age and same general social condition,

[10] Yerkes and Wood, *op. cit.*, p. 594.

[11] *Op. cit.*, p. 598.

then intelligence measured in I Q's and C I's should be a relative matter of distribution within the age groups. We should expect a certain proportion of the population to possess it, and should expect this proportion to be approximately constant at all ages.

From a practical point of view the I Q has the advantage of being the apparent limit toward which the C I approaches as the Point Scale norms are revised. For the years 7 to 13 (for which ages Dr. Yerkes says the Point Scale is most reliable) we have the average number of points awarded to each to be 6.9 2.2 by the old norms and 6.4 1.2 by the new. This means that correction of the norms for the Point Scale is making more equal distribution of points per year. Now, if the distribution of points is approaching an arithmetical progression, our table of norms is approaching two arithmetical progressions (one the years mental age, and the other the number of points corresponding to each mental age) differing in the size step but dependent upon one another. Let us then consider these two progressions. The I Q is calculated from the one (the mental ages); the C I from the other (the scores). Now if one progression varies with the other, then the I Q and the C I will also vary together and therefore have the same meaning. At present, of course, the column of scores does not vary exactly with the mental ages, but, as we have said, revisions in the norms are turning it strongly in this direction. So that it would seem simpler, as well as more correct in theory, to accept the I Q as the limit toward which the C I is approaching and to use the I Q now in place of the C I.

COMPARISON OF THE RATINGS BY THE POINT SCALE AND BINET EXAMINATIONS

A detailed comparison of the mental ages given by the two scales would be out of place here, because since we began this work more careful comparisons have been made by other investigators. From the data which we have, the average Point Scale mental age for years 5.5 to 6. 4 (Point Scale mental age) is 1.3 years lower; for 6.5 to 7.4 it is .8 lower; for 7.5 to 8.4 it is .3 lower; for 8.5 to 10.4 it is .6 higher; for 10.5 to 12.4 it is 1.0 higher and for ages above 12.5 it exceeds the Binet by increasingly greater amounts. The differences in the upper part of the scale are, of course, only natural since the Binet ratings were obtained from the Goddard revision, in which it is impossible

to attain a mental age higher than 12, while on the Point Scale the children could be graded as high as 18.

For the same reason as that given in the preceding paragraph we shall give no detailed discussion of the Binet and Point Scale I Q's. In order to eliminate the errors which would be introduced by taking the limit of the Binet examination (12) as adult mental age, we used 16 as the divisor in our computation of I Q's in each scale. The median of the Point Scale I Q's is .65; that of the Binet I Q's is .61. This slight differrence may be explained by the fact that the method used prevents the attainment by an adult of a Binet I Q of more than .75 since the highest mental age possible is 12, and therefore lowers the number of large Binet without affecting Point Scale I Q's. Moreover, the Binet I Q's correlate by rank differences to .84 with the Point Scale I Q's.

This brief comparison of results by the two scales shows: 1) between the Point Scale mental ages of 6.5 and 12.4 the average difference between Point Scale and Binet mental ages is not more than a year; 2) if the I Q is used instead of the mental age, the results of the two scales agree very closely.

COMPARISON OF THE REACTIONS OF THE NORMAL AND THE FEEBLE-MINDED. THE "VARIATION TOTAL"

Our data furnish a basis for comparing the typical reactions of the feeble-minded with those of the normal. Dr. Yerkes very kindly allowed us to study the records of 503 cases which he used in the original calculation of his norms for English speaking subjects. From these records we determine d the distribution of scores for each test for each age, counting 4.5 to 5.4 as age 5, etc. The mode, of course, in some places included only a small number of the cases, and we therefore selected the most frequent neighboring scores widely enough to include 75% of the cases. That is, we determined what central scores taken together made up 75% of the replies at a given age, by using the modal score, and, if necessary, the neighboring scores. When neighboring scores had to be used the largest ones were taken first. If there was a second mode or if there was a second large number, differing by not more than 1 or 2 from the mode, this was included. The table of scores making up 75% of replies was then smoothed, and the final numbers which were settled upon as "expected scores for normal subjects" are given in Table IV. Modal scores are italicized and the per cent of cases included in any

group of scores is indicated by the number given in small type. The only exception to this is test 6. The original examination gave slightly different scoring for this test so that it was impossible to say exactly what its modes were for the later years.

TABLE IV

EXPECTED SCORE FOR EACH TEST AT EACH AGE (NORMAL CHILDREN)

No. of Test	Score	18-24		25-30		31-37		38-45		46-52	
1	2, *3*	(63)	*3*	(47)	*3*	(74)	*3*	(89)	*3*	(100)	
2	1, *2*	(57)	*3*, 4	(68)	*3*, *4*	(70)	*4*	(58)	*4*	(71)	
3	*1*	(57)	*1*	(74)	*3*	(60)	*3*	(51)	*3*	(62)	
4	*2*, 3	(89)	*2*, 3	(74)	*3*	(51)	*3*	(44)	*3*	(44)	
5	*0*	(89)	*0*	(71)	*0*, 1, 2	(77)	*2*, 3, *4*	(80)	*4*	(78)	
6	2, 4		2, 4		2, 4		2, 4		2, 4		
7	*3*, 4, 5, 6	(91)	*6*	(50)	*6*	(59)	*6*	(79)	*6*	(78)	
8	*0*	(91)	*0*	(79)	*0*	(70)	*0*, 1, 2	(100)	*0*, 1, 2	(100)	
9	*0*, *1*	(74)	*1*, 2	(74)	*1*, 2, *3*	(81)	*2*, 3, *4*	(70)	*4*, *5*	(53)	
10	2, *3*, 4	(69)	*2*, 3, *4*	(76)	*2*, 3, *4*	(50)	*4*	(69)	*4*	(53)	
11	*0*	(60)	*0*, 1	(59)	*0*, 1	(62)	*0*, 1, 2	(75)	0, 1, 2, *4*	(100)	
12	*1*	(43)	*1*	(44)	1, *2*	(70)	*2*	(37)	*2*, *3*	(84)	
13	*0*	(63)	*0*	(53)	*0*	(45)	*1*	(42)	*2*	(44)	
14	*0*	(100)	*0*	(100)	*0*	(96)	*0*	(94)	*0*, 2	(78)	
15	*0*	(57)	*0*, 1	(71)	1, *2*	(64)	*2*, 3	(63)	*2*, 3	(67)	
16	*0*	(94)	*0*	(79)	*0*	(79)	*0*	(54)	*0*	(44)	

18	*0*	(100)	*0*	(100)	*0*	(100)	*0*	(99)	*0*	(91)
19	*0*	(100)	*0*	(100)	*0*	(100)	*0*	(99)	*0*	(80)
20	*0*	(94)	*0*	(88)	*0*	(85)	*0*	(68)	*1*	(47)

	53-60		61-66		67-71		72-75		76-7	
1	*3*	(100)	*3*	(100)	*3*	(100)	*3*	(100)	*3*	(100)
2	*4*	(77)	*4*	(100)	*4*	(100)	*4*	(100)	*4*	(100)
3	*3*	(85)	*3*	(100)	*3*	(100)	*3*	(100)	*3*	(100)
4	*3*, 4	(67)	*3*, 4	(72)	*3*, 4, 5	(97)	3, *4*, 5	(95)	*3*, 4, 5	(97)
5	*4*	(67)	*4*	(100)	*4*	(97)	*4*	(100)	*4*	(100)
6	2, 4		2, 4		2, 4		2, 4		2, 4	
7	*6*	(66)	*6*	(62)	*6*, 7	(77)	*6*, 7, 8	(86)	6, *7*, 8	(81)
8	*2*	(62)	*2*	(79)	*2*	(71)	*2*	(76)	*2*	(77)
9	*5*	(39)	*5*, *6*	(77)	5, *6*	(94)	*6*	(81)	*6*	(87)
10	*4*, 5	(62)	*4*, 5, 6	(74)	*5*, 6	(48)	6, *7*	(67)	*6*, 7	(51)
11	2, *3*	(61)	2, *3*	(74)	*3*	(55)	*3*	(71)	*3*	(74)
12	2, *3*, 4	(95)	*3*, 4	(82)	*4*	(55)	*4*	(57)	*4*	(71)
13	*2*	(43)	*2*, 3	(69)	*3*, *4*	(65)	*3*, 4	(62)	3, *4*	(81)
14	0, *2*, 4	(100)	2, *4*	(85)	2, *4*	(81)	*4*	(86)	*4*	(81)
15	*2*, 3	(54)	3, *4*	(67)	*4*, 5, 6	(87)	4, 5, *6*	(81)	*4*, 5, 6	(81)
16	*0*, 1	(67)	1, *2*	(51)	1, *2*, 3	(65)	1, *2*, 3	(71)	2, 3, *4*	(77)
17	1, *2*	(64)	*1*, 2	(51)	*2*, 3	(68)	3, *4*	(67)	*3*, 4	(74)
18	*0*, 1, 2	(85)	*2*	(59)	*2*, 4	(77)	2, *4*	(86)	*4*	(51)

19	*0*, 2	(95)	*0*, 2	(82)	*2*, 4	(90)	*2*, 4	(90)	*2*, 4	(90)
20	*1*	(61)	*1*, 2	(74)	*2*	(51)	*2*	(29)	*2*, *3*	(68)

	80-82		83-85		86*		87-88		89-100	
1	*3*	(100)	*3*	(100)	*3*	(100)	*3*	(100)	*3*	(100)
2	*4*	(100)	*4*	(100)	*4*	(100)	*4*	(100)	*4*	(100)
3	*3*	(100)	*3*	(100)	*3*	(100)	*3*	(100)	*3*	(100)
4	*4*, 5	(95)	*4*, 5	(85)	4, *5*	(67)	*4*, 5	(93)	*5*	(86)
5	*4*	(100)	*4*	(100)	*4*	(100)	*4*	(100)	*4*	(100)
6	2, 4		2, 4		2, 4		2, 4, 6		2, 4, 6	
7	*6*, *7*, 8, 9	(100)	8, *9*	(55)	*8*, 9	(83)	8, *9*	(57)	*8*, 9	(76)
8	*2*	(89)	*2*	(95)	*2*	(100)	*2*	(93)	*2*	(97)
9	*6*	(89)	*6*	(80)	*6*	(100)	*6*	(100)	*6*	(97)
10	6, *7*	(58)	6, 7, *8*	(90)	6, *7*, *8*	(67)	*7*, 8,	(71)	7, *8*	(72)
11	*3*	(68)	*3*	(75)	*3*	(67)	*3*	(86)	*3*	(66)
12	*4*	(63)	*4*	(75)	*4*	(83)	*4*	(100)	*4*	(90)
13	*3*, *4*	(95)	*4*	(80)	*4*	(83)	*4*	(93)	*4*	(83)
14	*4*	(89)	*4*	(85)	*4*	(83)	*4*	(93)	*4*	(93)
15	6, 7, *8*	(100)	*6*, 7, 8	(90)	6, 7, *8*	(100)	*6*, 7, 8	(93)	*8*	(72)
16	3, *4*	(42)	3, *4*	(75)	*4*	(50)	*4*	(57)	*4*	(62)
17	*3*, 4, 5	(100)	3, *4*, 5	(85)	*3*, 4, *5*	(100)	4, *5*	(79)	4, *5*	(86)
18	*4*	(42)	4, *6*	(80)	*4*, 6	(100)	*6*	(50)	*6*	(72)
19	*4*	(68)	*4*	(60)	*4*	(33)	*4*	(64)	*6*	(66)
20	2, 3, *4*	(89)	*2*, 3, 4	(65)	3, *4*, *5*	(83)	3, *4*, 5	(71)	*5*, *6*	(66)

*Only 6 cases.

From the table of expected scores we have obtained a "Variation Total" (V. T.), i. e. the sum of variations from the expected scores of that mental age for each normal case, for each of our 200 feeble-minded cases at the Waverley School, and for a group of patients at the Psychopathic Hospital. Patients diagnosed as feeble-minded are grouped in Table V with the Waverley cases. This table gives the distribution of Variation Totals for all the cases. In the last column will be found the distribution for a number of psychoses grouped together; the cases of dementia praecox, alcoholic psychosis, epileptic psychosis, syphilitic psychosis, unclassified paranoid psychosis, cases pronounced by all the staff to be psychotic but where there was disagreement as to the particular psychosis in question, and a few scattering cases of arterio-sclerotic psychosis, drug psychosis, etc. From this group we have excluded our cases of Psychopathic Personality, Manic Depressive Insanity, Hysteria, and Psychoneurosis, because these groups are in general so near the normal.

The medians, upper and lower quartiles for the different psychoses are given in the following abbreviated table:

Diagnosis	Median	Lower Quartile	Upper Quartile
Normal	7	5	9
Not psychotic	7	6	10
Retarded or subnormal	9	7	12
Feeble-minded	9	7	11
Psychopathic Personality	5	3	7
Manic-Depressive	8	5	12
Psychoneurosis	9	7	11
Dementia Praecox	9	7	13
Alcoholic Psychosis	12	10	14
Syphilitic Psychosis	10	8	14
Unclassified Paranoid	8	7	9
Unclassified Psychosis	9	8	12
Grouped Psychoses	10	7	14

The extremes lie with the psychopathic personalities (median 5) and the alcoholic psychoses (median 12). The fact that the psychopathic personalities seem to vary less from the expected scores for normals than do the normals themselves may be explained easily. The psychopathic personalities give total scores on the Point Scale ranging from 66 to 96 with the median at 87,

while the normals range from 18 to 97 with the median at 55. It is evident that the higher the total score is the less, roughly speaking, is the chance for variation. Thus if a subject gives a total score of 95 he can lose only 5 points throughout the 20 tests. He cannot get more than is expected in any test because (see Table IV) for total scores between 89 and 100 the highest score possible for each test is included under the expected scores. He, therefore, cannot possibly have a Variation Total of more than 5.[12] We have, then, in our psychopathic personalities a group of adults grading at adult mental age, who would probably not be less variable than a group of normal adults, but are less variable than our group of normal school children.

TABLE V

DISTRIBUTION OF VARIATION TOTALS FOR DIFFERENT DIAGNOSES

V. T.	Normal	Not psychotic	Retarded or sub-normal	Feeble-minded	Psychopathic personality	Manic-depressive	Psycho-neurosis	Dementia-praecox	Alcoholic psychoses	Epileptic psychoses	Syphilitic psychoses	Unclassified paranoid	Unclassified psychoses	Grouped psychoses
0	2	1			1		1		1			1	1	3
1	12	2		1	3		1							
2	17	5		3	6				1					1
3	28	11		9	3	1		2					1	4
4	50	6	1	13	4	1		4	1	2	1		1	9
5	77	13	1	31	5	2	1	1	1	3	1		3	9
6	61	20	5	33	6	1	2	4		1			3	9
7	71	17	9	39	3		2	5	2	2	2	2	8	22
8	50	19	6	50	4	3	1	7	2	2	1	2	11	25
9	46	14	10	35	1		2	6	2	2	1	1	6	20
10	37	15	7	49	1		3	4	4	1	2		5	17
11	23	6	5	23	2		1	3	7	2	1	1	4	18
12	13	8	4	21	2	1	3	1	3	1			5	11
13	4	1	3	27		1		5	3				2	10
14	5	1	3	17		2	1	3	5	1	1		5	16
15	1	4	5	14				1	1	1			3	7
16	2	2		7					3		3		3	10
17	2		1	2				3					1	4

[12] This may seem to suggest that V T's should have different significance for different total scores. We feel, however, that this is not true except for the extremely high scores. For our normals we have comparable distributions for different sizes of total score except that for scores above 91 we have no V T's larger than 6.

18	1							2	2	2				6
19				2					1	1			1	4
20	1			2				2	2				1	6
21				1								1		1
22							1		1		1			2
23														
24				1									1	1
25									1					1
26														
27		1						1						1
No. of cases	503	146	60	380	41	12	19	54	43	21	15	8	65	218

The alcoholic psychoses give by far the highest median V T. This high value is probably not a symptom of alcoholic psychosis itself, but rather of advancement of deterioration or depth of psychosis. Many persons, doubtless, would expect the dementia praecox patients to show greater variability than the alcoholics, and in the majority of hospitals for the insane this would probably be true, but in the Psychopathic Hospital in Boston we have a rather selected group. The selection may be illustrated by statements concerning two classes: the alcoholics and the dementia praecox. The latter group find their way into institutions comparatively early in life. They show hallucinations and delusions, etc., before they have deteriorated markedly and so, by the time they are greatly deteriorated they are already in a state asylum and not likely to enter a "clearing house" like the Psychopathic. Our dementia praecox cases, then, will be little deteriorated and, unless decidedly schizophrenic, will not show large variations. The cases of alcoholic psychoses, on the contrary, do not come into the hospital until they are older and until their psychosis has begun to interfere definitely with their work. Besides the initial selection there is a further selection in the cases which are referred for psychological examination. The great majority of patients under age 25 are sent for this examination. This includes a great many cases of beginning dementia praecox, and practically none of beginning alcoholic psychosis. Of the more advanced cases, the alcoholics are more accesssible and so if the problem is one of degree of deterioration, a deteriorated alcoholic will, in general, co-operate better than a deteriorated dementia praecox. This means that more deteri-

orated alcoholics will be referred to the psychological department and that of those referred we shall be able to use the record of a greater per cent of alcoholics than of dementia praecox.[13]

The above discussion may be interpreted to mean that we may expect larger variations from cases of psychosis of long standing and that in general our data err on the side of conservatism, *i. e.*, that probably we may expect an unselected group of psychotics to show greater V T's than the ones we have given.

We find from the table that the unclassified paranoid give small V T's. The diagnosis means, practically, that the patient has no symptoms other than paranoid ideas. Admittedly, then, said patient is not taken by the psychiatrists to be either deteriorated or markedly psychotic. And we find a small V T. The manic-depresssives also give a comparatively small V T, but here we have a wide range with quartiles at 5 and 12.

On the whole the outstanding feature of our table is that normals and "not psychotic" subjects give smaller V T's than do the feeble-minded, and that the feeble-minded give smaller V T's than do the deteriorated or the markedly psychotic patients.

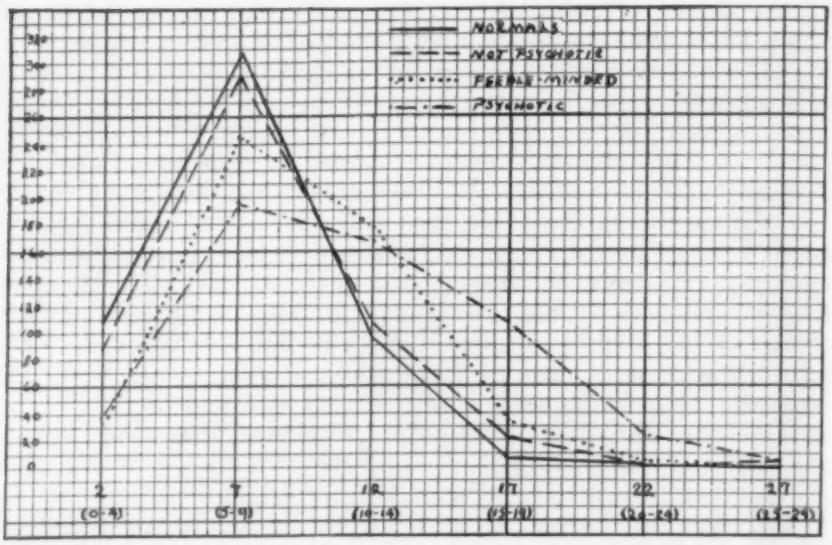
We have computed the probable correctness of the difference[14] for our larger groups. The average V T's for these groups are:

Normals	Average	6.8	P. E. 2.03
Not psychotic		7.6	2.44
Feeble-minded		9.2	2.40
Grouped psychotics		10.6	3.22
Probable correctness of differences between:			
Normal and not psychotic			.57
Normal and feeble-minded			.70
Normal and psychotic			.75
Feeble-minded and psychotic			.62
Feeble-minded and not psychotic			.62
Psychotic and not psychotic			.69

Plate I (a) gives the data in Table V in graphical form. We have grouped the Variation Totals into the divisions 0-4, 5-9, 10-14, 15-19, 20-24, 25-29. We have moreover supposed that a larger number of cases in any one of our four large groups

[13] In our computations we have thrown out all cases recorded as showing poor co-operation, and all those having any language difficulty.

[14] Boring, E. G., The Number of Observations upon which a Limen may be Based, A. J. T., 1916, XXVII, p. 317.



would give the same general distribution shown by the cases already examined; and we have consequently multiplied the figures for the "not psychotic" by 3.5, those for the feeble-minded by 1.3, and those for the psychotics by 2.3 to make these groups of the same size as our normal group.

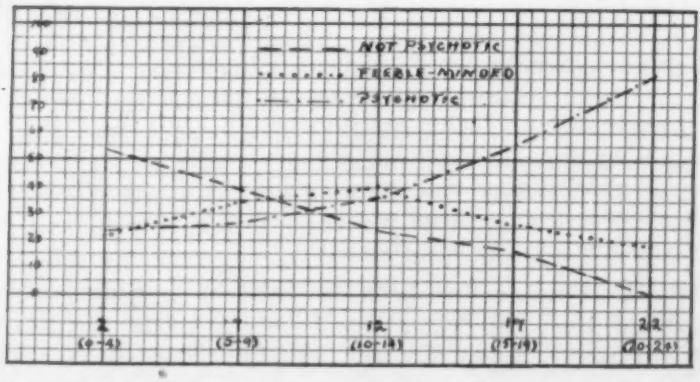


Plate I (b) shows the probability that a case having any given V T will belong to each of our large groups. Supposing 100 cases at each size V T and supposing equal numbers of the different diagnoses, then from the curves we may read the chance

that any given case is feeble-minded, or psychotic, or not psychotic. Normals are not included for the obvious reason that patients are diagnosed not "normal" but "not psychotic." The table from which this plate was made is given below:

PER CENT OF CASES FOR DIFFERENT SIZES V T FOUND UNDER THE DIFFERENT DIAGNOSES

V T	Not Psychotic	Feeble-Minded	Psychotic
0– 4	54	22	24
5– 9	39	34	27
10–14	24	40	26
15–19	17	27	56
20–24	0	19	81
25–29	(too few cases)		

If we disregard the diagnosis "not psychotic," we may say roughly that cases giving V T's above 15 (and particularly above 20) are more likely to be psychotic than feeble-minded.

There are many other problems in variability which we hope to attack at some future time. First, there is the question of what variations we would get if our table of expected scores gave the score expected for each *part* of each test. It seems probable that epileptics would show greater variability by parts of tests than by wholes. Then there is the question of types within the psychoses. For example, are the hebephrenic dementia praecox more or less variable than the dementia simplex? Doubtless the paranoid dementia praecox would show small variation totals. There is the question of the variability of super-normal children. From our casual observation of a few such children, it would seem that they have high V T's. Many other problems arise and offer a large field for work

TESTS WHICH ARE EASY FOR THE NORMAL OR FOR THE FEEBLE-MINDED

If we compare Table IV of expected scores for the normals and a similar table for the feeble-minded, we find that given the same mental age, we expect higher scores from normals in tests 4 (repetition of digits), 6 (repetition of sentences), 9 (comparison of objects), 10 (concrete definitions), 13 (free association), and 14 (three words in one sentence), and higher scores from the feeble-minded in tests 7 (interpretation of pictures), 11 (resistance of suggestion), 12 (copying square and diamond),

and 15 (comprehension of questions). These lists are drawn merely from observation of the two tables, and are not conclusive. They may be checked by approaching the problem by another path. If we take into account the algebraic sign of the variations of the feeble-minded scores from the normal expected score, we obtain the average deviations of the feeble-minded from the normal as follows:

Test	+	−	Test	+	−	Test	+	−	Test	+	−
1	0	.06	6	.08	.06	11	.14	.32	16	.50	.10
2	.01	.26	7	1.18	.07	12	.21	.11	17	.25	.16
3	.04	.07	8	.04	.22	13	.17	.55	18	.30	.19
4	.15	.24	9	.09	.53	14	.05	.28	19	.39	.13
5	.03	.26	10	.24	.18	15	.70	.04	20	.35	.16

We find then that the feeble-minded give scores higher than the normal in Tests 6, 7, 10, 12, 15, 16, 17, 18, 19, 20, and scores lower than the normal in Tests 1, 2, 3, 4, 5, 8, 9, 11, 13, 14. If we consider only the cases in which the difference is 10 or more, we have the feeble-minded superior in Tests 7, 12, 15, 16, 18, 19, 20, and inferior in Tests 2, 5, 8, 9, 11, 13, 14. When these lists are compared with the lists obtained by the first method used, we find that the two agree in calling Tests 7, 12, and 15 easy for the feeble-minded, and Tests 9, 13, and 14 hard for the feeble-minded. The only disagreement is in Test 11, which is called easy in one list and hard in the other.[15]

We should suppose that superiority of the feeble-minded in certain tests would be due either to special training or to the experience brought with increasing chronological age. Terman[16] has summarized some of the conclusions made on the influence of the age factor. If we consider tendency for percentage of successes to increase with age as the equivalent of a tendency for the feeble-minded to pass the tests more easily than the normal, then we may say that of the Point Scale tests we should expect the feeble-minded to excel in:—comprehension of questions, definitions by use, and probably copying square and diamond;

[15]Doll reports (N. Y. Meeting of the Am. Psych. Ass., Dec., 1916) that definitions (concrete and abstract), reactions to pictures, comparison of objects, memory span, absurdities, sentences containing 3 given words, and free association are easy for the feeble-minded; and that comparison of 2 weights, aesthetic comparison, copying square and diamond, missing parts, counting backward, arrangement of weights, and drawing designs from memory are hard for them. We agree with Doll on one point only, that the interpretation of pictures is easy for the feeble-minded.

[16]Terman, L. M. The Stanford Revision and Extension of the Binet-Simon Scale for Measuring Intelligence, Warwick & York, 1917, p. 143.

and to be inferior in:—repetition of 6 digits and of syllables, dissected sentences, 60 words in 3 minutes. This would mean that our feeble-minded should receive higher scores in tests 10 and 15, and probably in 12; and that they should receive lower scores in tests 4, 6, 13 and 18. On referring to our table, we find this upheld except in the case of 18 (dissected sentences).

In Appendix I we give a qualitative table of typical responses of feeble-minded at different mental ages.

DIFFICULTY OF THE DIFFERENT TESTS

The question of which tests it is safe to omit in the examination of a patient who is evidently very low grade depends upon the determination of which tests are most difficult. Some idea of this may be obtained from the table of expected scores. If we arrange for each year the tests in order of per cent of total possible score which was attained, we find that roughly speaking the first ten tests are easier than the last ten, that test 1 is easiest of all, that tests 2 and 3 come next, and that 16, 17, 18, 19 and 20 are the hardest. Such a method, however, does not give results exact enough to use in determining the tests which may be omitted. If we take the original data on our feeble-minded for each test and find the average per cent of total possible score for each test attained by the 200 cases, we find that tests 1, 2 and 3 are the easiest; then come 5, 7 and 12; then 4, 8, 9, 10 and 11; then 6, 13, 14, 15, 16, and 17; and hardest of all are 18, 19, and 20. Since the whole of tests 4 and 6 is not given unless all preceding parts have been passed, we should not consider them in a comparison of the different tests. The other eighteen tests are found to be arranged in the Point Scale in the order of increasing difficulty with the exception of test 12 which is easier than test 8 and harder than test 7.

The subdivisions are generally arranged in the Point Scale in order of increasing difficulty. Some exceptions to this rule are that in test 10 part (c) is the easiest of all; in test 17 part (b) is the easiest; in test 19 part (b) is easiest; and in test 20 (c) is easier than (b), and (f) is easier than (d) or (e).[17]

In this connection it may be interesting to note that the lowest age at which any test received full credit was 5.4 when test 2 was passed. At the other end of the scale comes test 20,

[17] Recent experience has shown that the present European war has had a great influence on part (f) of this test; for, up to the time of the war, this part was decidedly the hardest one in the test, but since the beginning of the war, the percentage of correct responses has increased enormously.

which never received full credit under the mental age of 15. On the other hand, no one over mental age 5.9 ever failed to receive full credit in test 1.

RESULTS FROM THE ADULT POINT SCALE EXAMINATION

A table comparing the Adult Point Scale scores of our group with the Child Point Scale Scores has already been published[18] and shows that on the average the adult score is .51 of the child score. On the child scale we find a range of from 92 to 62 points; on the adult a range of from 54 to 20. If the scores on the two scales are compared by the method of Rank Differences the coefficient of co-ordination is .81 P. E. .04. There is, therefore, high correlation between the scores obtained on the two scales.

Six of our 33 cases show a somewhat wide divergence from general rules. Case 194 has an adult score which is 70% of her child score; case 189 one of 68%; case 187 one of 74%; case 188, one of 40%; case 186, one of 34%, and case 166, one of 26%. The reasons for these extreme results are not clear.

The question as to which of the adult tests are the most difficult for our subjects may be answered roughly by comparing the average per cent of total score which was obtained for each test. The tests arranged in order from easiest to hardest are as follows: 2 (comparison of weights) 85%; 19 (copying diamonds), 71%; 20 (designs from memory) 68%; 9 (absurdities), 68%; 17 (ball and field), 50%; 1 (description of pictures), 50%; 5 (memory for sentences), 47%; 4 (suggestibility), 45%; 12 (relation test) 44%; 10 (analogies), 42%; 7, (comprehension of questions), 41%; 6 (comparison of objects), 41%; 3 (memory span), 41%; 8 (definitions) 30%; 13 (box test), 29%; 11 (association of opposites), 27%; 16 (code), 15%; 15 (comparison of capital letters), 14%; 18 (geometrical construction), 8%; 14 (ingenuity)%.

In Dr. Yerkes' revision of the adult scale, he has dropped test 2 and 19, as being unsatisfactory, and has dropped 14 on account of a very large sex difference found. These changes are in accordance with the impressions gained in giving the examination to the feeble-minded. We also found great variations in test 1, due apparently to too great a range of interpretation of directions; some subjects try to give a description from an artistic point of view, and so fail in the end to give the number of details necessary for full credit, although their discussion of the picture

[18] Yerkes and Rossy, *op. cit.*, p. 572.

may be, by ordinary standards, far superior to an enumeration of things seen in the picture.

It may be remembered that we expected to work out the significance of the separate tests as tests of intelligence. We approached the subject from several points of view, such as finding the coefficient of variability for each of the tests, finding the coefficient of correlation between scores on separate tests and total scores, etc., but our results convinced us of nothing more than the fact that the question could not be settled without the use of much more statistical work than we had time to give or than the paucity of our data would authorize us to give.

CONCLUSIONS

1) The revised Point Scale norms give a more probable distribution of cases than do the old norms.

2) The Intelligence Quotient is preferable to the Coefficient of Intelligence both from a theoretical point of view and from the application to individual cases.

3) Point Scale and Binet mental ages agree well for the middle portion of the range of ages. Point Scale and Binet I Q's, both computed with 16 as adult age, give a coefficient of correlation of .84.

4) Tests which are easy for the feeble-minded are: comprehension of questions, definitions by use, and copying square and diamond. Tests which are hard for them are: repetition of 6 digits and of syllables, and giving words in three minutes.

5) The tests on the Point Scale are arranged approximately in order of difficulty.

6) The Adult Point Scale (preliminary form) gives scores about one-half of those obtained by the same subject on the Child Point Scale.

7) Either 12 is decidedly too low for the Point Scale mental age above which persons are not feeble-minded, or the Waverley School has a number of children who are not intellectually inferior.

8) The Variation Total is useful as an aid in differentiating between feeble-mindedness and deterioration.

APPENDIX A

VARIETIES OF ANSWERS GIVEN AT DIFFERENT MENTAL AGES

(Figures in parentheses indicate mental ages at which the different answers were given.)

Test 1

There were in all only three failures (5, 8, 9) in this test and all of these came in the comparison of the third pair of faces.

Test 2

No failures were made in picture a; nine (6 to 12) occurred in picture b alone; thirteen (6 to 10) in picture c alone; nine (8 to 15) in picture d alone; three (7 to 9) in both b and c; seven (8 to 9) in both c and d; and four (5 to 8) in all three pictures b, c, and d. We should therefore expect picture a to be passed if any of the test is passed, and should expect part c to be failed more often than either b or d.

Test 3

No failures were made in part a. Four subjects (5 to 9) failed in part b; three (6 to 8) in part c; and nine (5 to 8) in both c and d.

Test 4

(This test needs no discussion since it is evident that each part is more difficult than the part preceding.)

Test 5

(Mental age 10) No failures to count backward from 20.

(9) 77% succeed from 20; 7% from 15; 8% from 10; 1% from 5; 7% fail

(8) 55% succeed from 20; 15% from 15; 9% from 10; 9% from 5; 12% fail

(7) 25% succeed from 20; 0% from15; 13% from 10; 0% from 5; 63% fail

(6) 0% succeed from 20; 0% from 15; 0% from 10; 14% from 5; 86% fail

There is then, some probability of a child between the mental ages of 6 and 9 receiving partial credit in this test, but ordinarily he will receive either full credit or none.

Test 6

This test, like test 4, needs no discussion here.

Test 7

In part a the description "man and boy pulling wagon" was given 24 times; "moving" was given as interpretation 21 times; and expressions like "no horse," "man for horse" 58 times. In part b "man and lady sitting on settee" was given 28 times and the

interpretations "man asleep" 38 times, "man dead" 13 times, "poor" 16 times, "no home" 13 times, "sick" 14 times. In part c "standing up" and "looking out the window" were practically the only descriptions given, and "in prison" the only interpretation.

Typical answers for the different mental ages are:

Part (a)

(6) "Man and boy pulling the wagon," "Wheels are on crooked."

(7) "Pulling team along," "Man trying to tip it over."

(8) "Team tipping over. One old man and one boy. Two wheels off," "Man for a horse. Man pushing him."

(9) "Man and boy pulling cart with load of furniture," "Peddlar's cart. Man sells things, boy helps him," "Moving. Making horses out of man and boy. Germans after them."

(10) "Pretty poor. No home." "Horse has run away. Man and boy took his place. Storm. Wagon going to tip over."

(11) "Having hard time. It would be better if they had a horse. Load apt to tip over." "In time of war. Burnt out by a shell. Took what they could with them."

(12) "Olden times. Poor people couldn't buy horses. Had to pull own loads." "Man poor. Was out in a dump, saw old cart. Boy belongs to him. Found as much furniture as he could. Hard working man."

(15) "Furniture? Moving day." "Shows old man and son or grandson walking up slippery hill with cart. Furniture on cart. Seem to be moving."

Part (b)

(6) "Lady and man sitting on settee."

(7) "Sleeping on the common." "Lady and man. Lady holding on to man's arms."

(8) "Father and mother and settee they're sitting on." "Looks as if they were cold." "Man asleep, woman awake on settee."

(9) "He fell asleep. She looks scared." "People look poor."

(10) "Man looks dead. Must be his daughter." "Man looks as if he was trying to help that woman." "Snowing. He's praying."

(11) "Old and tired. Have no home to go to." "Man is sick. Lady worrying over him."

(12) "Haven't any home to go to, so are sleeping there." "Man blind. Woman must be deaf. Lost his hat."

Part (c)

(6) "Standing up, looking out window."

(7) "Man standing near post." "Standing up on couch."

(8) "Fixing the window." "Looking out the window."

(9) "Looking out the window for someone." "Man in prison, looking out toward the sky."

(10) "Locked in prison for someth'ng he's done. Trying to plead to get out " "Watching to see if his wife is coming home."

(11) "In prison trying to look out and get air. Done something wrong in his life."

Test 8

In cases in which partial credit was given, the following inversions in order occurred: of weights 3 and 6, twenty-nine cases (7 to 14); of weights 6 and 9, fourteen cases (7 to 13); of weights 9 and 12, twenty-two cases (8 to 15); and of weights 12 and 15, twenty-four cases (7 to 15). From this it is evident that weights 3 and 6 are differentiated with the most difficulty. According to Weber's Law we should expect that 3 and 6 would be most easily arranged, and 12 and 15 with the most difficulty. If we disregard the confusion of 3 and 6, we find the other pairs arranged as would be expected.

It is interesting in connection with this test to note that almost without exception subjects called weights 3 and 6 "light" and the other blocks "heavy."

Test 9

Part (a)

The differences between apple and banana most frequently given are: shape, 153 times (5 to 15); color, 68 times (5 to 15); kind or size of seeds, 27 times (8 to 15); method of peeling, 18 times (8 to 15); possibility of eating the skin, 18 times (8 to 14). Besides these main differences, we find differences in sweetness (8 to 15); in thickness of skin (8 to 15); in kind of stem (8 to 11); in number growing together (9 to 15); in hardness (7 to 13); in core (10 to 12); in climate where grown (11 to 15); in juiciness (10 to 15) in size (7 to 14); in weight (7); in time of year obtainable (9) in nutritive value (9); and in possibility of being made into cider (11).

Part (b)

The differences between wood and glass most frequently given are: transparency, 90 times (8 to 15); use, 59 times (5 to 15); ease with which it is broken, 55 times; and possi-

bility of burning, 26 times (6 to 15). Other differences given less frequently are: whether it is made or grows (9 to 15); smoothness (9 to 11); method of cutting (8 to 11); shape in which it comes (9); cost (10 to 11); bark (11); color (12); whether nails can be driven into it (9); whether it is usually painted or varnished (13); and whether it becomes soft when left in water (12).

Part (c)

The differences between paper and cloth most frequently given are: use, 114 times (5 to 15); ease with which it is torn, 44 times (8 to 15); possibility of writing on it, 20 times (7 to 15); and possibility of sewing it, 10 times (8 to 12). Other differences given less frequently are: thinness (8 to 13); smoothness (8 to 11); whether it is woven or pressed (14 to 15); whether it burns easily (8 to 9); what it is made from (11); softness (12); cost (12) and whether it washes (8).

From this we see that the differences most often given are those of appearance and use. Differences in use are not given in part (a) because the use of the two is the same; similarly differences in appearance are not given in part (c).

Test 10

Part (a)

In cases where partial credit was given there were 156 definitions in terms of use (5 to 15) and 23 definitions (8 to 12) where a spoon was said to be lead, tin, silver, steel, brass or metal.

Part (b)

In cases where partial credit was given, there was 142 in terms of use (5 to 15); and 12 (8 to 11) where a chair was said to be wood.

Part (c)

In this part we have 99 cases (5 to 15) in terms of use, and none in terms of material.

Part (d)

In this part there were a great many statements which were classed as use, although they were often merely statements about a baby, such as "what you rock," "take care of," "plays all the time" (5 to 11). The definition "infant" was given 36 times (7 to 15). There were no definitions in terms of material.

Test 11

In this test there seems to be no tendency for errors to occur in

the comparison of any particular pair of lines.

Test 12

Part (a)

There was only one case of no credit for the square (6).

There were 44 cases of half credit (5 to 12) and 155 of full credit (5 to 15).

Part (b)

There were 22 cases of no credit for the diamond (5 to 9); 66 of half credit (6 to 15); and 112 of full credit (7 to 15).

It is evident, of course, that the diamond is much more difficult than the square.

Test 13

In this test there were 43 cases (5 to 15) in which less than 30 words were given; 49 cases (5 to 15) of 30 to 44 words; 48 cases (8 to 13) of 45 to 59 words; 34 cases (8 to 15) of 60 to 74 words; 22 cases (9 to 15) of 75 to 99 words; and 4 cases (8 to 15) of over 100 words.

Test 14

There are several kinds of error in this test. Total failure to give anything there were 34 cases (5 to 11); of giving three separate sentences, 37 cases (7 to 15); of using only two of the words 12 cases (6 to 10); of using only one word, 7 cases (7 to 8); and of making senseless sentences 6 cases (8 to 10).

If these failures are arranged in order of the average mental age of the subjects, we have: no sentence and only one word used (7.7); senseless sentences and only two words used (8.7); and three sentences given (9.0).

Test 15

Typical answers for the different mental ages are:

Part (a)

(6) "Hurry." "Go to Boston." "Get on another."

(7) "Telephone." "Have to stay there." "Wait for another."

(8) "Stay and wait for another." "Walk."

(9) "Wait and get another." "Take electric car."

(10) "Ask when next one comes," and other correct answers.

Part (b)

(6) "Very sorry." "Cry." "Serve them back." "Say 'Thank you.' "

(7) "Apologize." "Be nice to them." "Say I'm sorry too."

(8) "Be kind to them." "Please excuse me." "Forgive them."

(9) "Beg their pardon." "Say all right." "Forgive them."

Part (*c*)

(6) "Cause he's disagreeable." "He steals."

(7) "He don't mean all he says." "Don't know any better."

(8) "Give him another trial." "Might be telling a story."

(9) "It's meaner than saying." "Shouldn't judge him." "Actions are more than what he says."

(10) "Sometimes you can't always believe what he says." "What he does you can see him doing it." "Judge him by looking at him, can tell if he's telling a lie."

(11) "Actions speak louder than words." "Cause you can tell better by what he does."

(12) "Sometimes people say what they don't mean. Their actions show more than what they say." "Can *see* what they do."

Part (*d*)

(6) "Because they're always disagreeable and cranky." "Tell the truth."

(7) "Because we don't do right." "Cause they don't know what they're doing."

(8) "Because they're rude." "I wouldn't." "Give them kind words."

(9) "Because we're sorry." "When angry don't think of the things you do as quickly as when you're not angry."

(10) "Feel more sorry for them." "With anger, he's not really responsible."

Test 16

Part (*a*)

The most common error was to draw the figure as a cube. The reason for this was apparently that the subjects named the figure a "box," and then afterward drew the ordinary figure of a box.

Part (*b*)

There was no error which appeared more often than other errors.

Test 17

Typical answers for different mental ages are:

Part (*a*)

(6) "Hands in pockets." Repetitions of the sentence.

(7) "Because he was drinking." "Silly." "Hands in pockets."

(8) "Trying to show off." "Charlie Chaplin." "Anybody that goes by don't swing their cane."

(9) "No gentleman swings his cane." "Looks funny on the street." Correct answers.

(10) "Should have been walking sensible." Correct answers.

Part (*b*)

(6) "Fell on the ground." "Broke his legs."

(7) "He cured him." "Went too fast."

(8) "He hadn't ought to have been riding." "If he had been more careful, he wouldn't have cut himself." "Died before he got there, maybe."

(9) "Fell on his head. Don't often see people falling on their heads." Correct answers.

(10) Correct answers.

Part (*c*)

(6) Repetition of sentence. No response.

(7) "Paul." "Should say self last."

(8) "Three different brothers; wasn't the same brothers." "Should have said I."

(9) "If it was a girl, he had only two brothers and a girl." "Trying to make you think he had an extra brother."

Part (*d*)

(6) Total failure.

(7) Total failure.

(8) "Funny place to inquire." "Passed the road."

(9) "Shouldn't go to the blacksmith, should go to the station." "Wasn't any blacksmith there."

(10) "They don't teach you to read at the blacksmith-shop." Correct answers.

(11) "Should inquire at the post-office." "Ask one of the people that's walking on the street." Correct answers.

Part (*e*)

(6) Total failure

(7) Total failure

(8) Total failure

(9) "Why should they?" "Safer in the last car than in the first." "If one falls, they all go." "Last car can't leave off; it's a baggage car."

(10) "If last car is more damaged, it's better to leave it off." "Have to leave it off before it gets damaged." Correct answers.

(11) "Anyone amongst them is damaged enough." "They think the last car will slip off." Correct answers.

(12) "Front car would be most in danger, it has to follow where the train goes." Correct answers.

Test 18

Part (a)

The sentence most frequently given was "I asked my teacher to correct the paper." This was given 50 times (8 to 15); "I asked the teacher to correct my paper" was given 18 times (8 to 15); "I asked my teacher to correct my paper" 17 times (8 to 15); "I asked the teacher to correct the paper" twice (9 to 12).

Part (b)

In this part the sentences "A good dog defends his master bravely" and "A good dog bravely defends his master" were given 30 times (10 to 15); "A good master bravely defends his dog" 5 times (12 to 15). Correct sentences in which "good" modifies the second noun used, such as "A master defends his good dog bravely" and sentences in which "his" modifies the first noun, such as "His dog defends a good master bravely" were given 6 times (8 to 15).

Part (c)

In this part "We started at an early hour for the park" and "We started for the park at an early hour" were given 33 times; "We started early at the park for an hour" 3 times (10 to 12); and "We started at the park for an early hour" twice (11).

Test 19

Typical answers for this test are:

Part (a)

(6) "Sitting on." "Sister." "Give anything away what you have."

(7) "Haven't got no home." "When you go any place." "To help the people."

(8) "Bird." "Little wagon." "Carriage." "Person ain't got no home, on charity."

(9) "Poor people." "They have meetings." "Be good to a person." "Love to God." "State Board of Charity be 'guardeens.' "

(10) "Kindness." "To be good." Correct answers.

(11) "Doing some kind act." Correct answers.

(12) "Doing good for somebody, help them." Correct answers.

Part (b)

(6) "Priest." "Don't obey, ask."

(7) "Do something that's right." "Don't know how to behave yourself." "To obey your teachers."

(8) "Bad." "When you don't mind." "Some kind of a bird." "To be good."

(9) "Rough." "Be polite." "True." Correct answers.

(10) "Law and liberty. Be good and kind." Correct answers.

Part (c)

(6) "Minister." "Hope." "Don't ask for anything."

(7) "Be good." "When you can do things."

(8) "Be bad." "Don't digest your food." "Be honest and careful what you do."

(9) "Do what's right." "Do just what you're supposed to do." "Peace, be kind to horses and animals."

(10) "When a man is arrested, put him in justice." "The law." "To have peace." Correct answers.

(11) "Be kind." "Doing right." Correct answers.

(12) "Have peace." "In court." Correct answers.

In this test, on the whole we get at the younger mental ages a confusion of the abstract term with some similar concrete term such as "Carriage" (Chariot?) with "Charity;" "Priest" with "Obedience;" and "Digestion" with "Justice." At higher mental ages, we find definitions which show some inkling of the real meaning, such as, "Haven't any home" for "Charity;" "To be good" for "Obedience;" and "The law" for "Justice."

Test 20

Part (a)

Of the possible correct answers, "peel" was given 100 times (7 to 15), and "peeling" 6 times (11). Probably the reason that "peel" is more common and given at lower ages than "peeling" is that it may be used as a verb and the younger children tend to take the "to" in th e analogy as the beginning of an infinitive. Among the incorrect answers we have 50 verbs (8 to 15); 6 nouns (5 to 12); 1 adjective referring to the second half of the analogy (8) "yellow;" and 1 answer which relates to the first part of the analogy (6) "Oyster goes in with cracker."

Part (b)

In this part "knee" was given 40 times (7 to 15); verbs 100 times (5 to 15); nouns referring to the second part 52 times

(8 to 15); and nouns referring to the first part 5 times (6 to 9).

Part (c)

In this part "glove(s)" was given 43 times (9 to 15); "mittens" 2 times (9); verbs 94 times (5 to 15); nouns relating to the second part 40 times (8 to 15); words relating to the first part 9 times (5 to 10).

Part (d)

In this part "crooked line" was given 15 times (8 to 15); "crooked" 5 times (9 to 15); "crooked one" 4 times (11 to 15); "uneven line" once (12); "round one" once (12); "curve" once (14); verbs 31 times (6 to 11); nouns relating to the second part 7 times (9 to 12); words relating to the first part 58 times (6 to 13).

Part (e)

In this part "absent" was given 8 times (9 to 15); "future" 7 times (9 to 12); "be absent" once (8); "past" 14 times (9 to 15). There was some confusion between "present" meaning time, and "present" meaning gift. Of words relating to time, there were 21 verbs (8 to 11) and 15 nouns (9 to 15). Of words relating to a gift, there were 16 verbs (7 to 14); 11 nouns (9 to 12). There were 32 words relating to the first part of the analogy (6 to 12).

Part (f)

In this part "peace" was given 39 times (8 to 15); "have peace" 2 times (9 to 10); "be in peace" once (9); and "make peace" once (11). Of words relating to the second part, there were 108 verbs, of which "fight" was given 44 times (6 to 13); "cease" 22 times (8 to 13); "stop" 15 times (8 to 15) nouns 5 times (8 to 12); and adjectives 8 times (9 to 15). There were 23 words given relating to the first part (5 to 11).

Throughout this test we find that in the incorrect answers verbs are given more often and at younger mental ages than other parts of speech, nouns come next and then adjectives. Part (e) gives the greatest variety of replies, probably because there is no verb which is readily associated with "present."

APPENDIX B

TYPICAL ANSWERS TO POINT SCALE QUESTIONS AND THEIR EVALUATION

Test No. 7 (a):

Full Credit (3): "Man and boy. He's pulling that cart, got it loaded with something, pulling hard." "Man trying to pull it up." "Ain't got no horse." "Looks as if it was going to tip over." "Raining. Boy's father pulling load of furniture up hill." "Peddlar's cart. Man sells things. Boy helps him." "Have no horse. Must be kind of poor, in war, bringing their furniture with them. Neither look very intelligent." "Heavy load. Men tired." "Seem to be moving."

Credit of 2: "Man and boy dragging cart." "Hay or something in team. Two men pulling it." "Pulling team up. It's kind of tipping over. Man and boy." "Pulling load of furniture on wagon."

Credit of 1: "Man and boy, furniture, baskets, rain, post, tables." etc.

Test No. (b):

Full credit (3): "Man sleeping, lady thinking." "He's sick or dying, she is taking hold of his arm." "People look poor." "That lady shouldn't be there." "Man must be dead." "Man looks as if he was trying to help that woman." "Man and woman side of the road. Man older than woman." "She looks cold." "Man making love on a settee." "Man lost his hat." "Man looks dead. Must be his daughter." "Must be without a home, poor, man sick. Woman trying to tell what is the matter with him, both sad." "Out of work, hungry, poor." "Man sleeping."

Credit of 2: "Sitting down on a settee." "Lady sitting on a settee. Man side of her." "Lady and man. Lady holding on to man's arms." "In a park. Old man and woman sitting on a bench. Hat on ground."

Credit of 1: "Man and woman, trees, and snow." "Man and lady."

Test No. 7 (c):

Full credit (3): "Standing up to trees in a house where they are camping out." "Looking out window for someone." "Watching to see if his wife is coming home." "Prisoned in." "He fell asleep standing up." "Peeking out the window." "Stand-

ing up. Lonesome. Looking out the window." "Standing as if saying prayers."

Credit of 2: "Standing up looking out window." "Man looking in a glass." "Climbing up a tree." "Fixing the window." "Man reading."

Credit of 1: "Telephone, chair, book." "Man, chair, box, two tables."

General Rules for Grading Test No. 7

For simple enumeration, whether all articles are named correctly or not, give 1 point. As for example in (b), subjects will sometimes say "two men" or "two women" instead of a man and a woman.

For simple description, statements about the position of persons or objects, statements of color, or any statement concerning anything that can be *seen*, give 2 points.

For a "story" about the picture, any statement that implies any sense than sight (as, for example, statements of temperature, or sound), statements about something that has happened before or is to happen after the moment at which the picture is taken, statements concerning the feelings of persons, or of the relationship between persons, give 3 points.

Doubtful cases. Some statements which would surely be interpretation when given by an older person, are probably mere enumeration when given by children. As, for example, "old man" and "grandfather." In such cases, do not grade until you have read answers given for other parts of this test. If the other parts give enumeration, count the doubtful case as enumeration; if they give interpretation, count the doubtful as interpretation.

Test No. 9 (a):

Give credit for such differences as: "Apple round, banana long." "Apple red, banana yellow." "Apple sometimes red, sometimes green, banana sometimes yellow, sometimes red." "Apple harder than banana." "You peel a banana with your fingers, have to peel an apple with knife." "Banana sweeter than apple." "You can eat the skin of an apple, can't of a banana. "Skin of a banana is thicker." "Can get banana all the year, apple only part of the year." "Apple has stem, banana doesn't." "Apple has core, banana doesn't." "Banana grows in bunches, apple doesn't." "Apple is juicier than a banana." "Apple weighs more than a banana." "Apple grows in cold climate, banana in warm." "Make cider of apples, not of bananas." "Apple easier to digest."

Test No. 9 (b):

Give credit for such differences as: "Glass is transparent, wood is not." "Wood burns, glass does not." "Glass breaks easier than wood." "Wood grows, glass is made." "Use wood for houses, etc., glass for windows, etc." "Wood gets soft in water, glass does not." "Glass is more expensive than wood." "Wood is brown, glass is no color (or white)." "Glass generally comes in flat sheet, wood in blocks." "Wood has bark, glass hasn't." "Wood is generally painted or varnished, glass isn't." "Can drive nails into wood, can't into glass."

Test No. 9 (c):

Give credit for such differences as "Paper tears more easily than cloth." "Cloth is woven, paper is pressed." "You can write on paper, can't on cloth." "Can sew on cloth, can't on paper." "Cloth is for clothes, paper for wrapping." "Paper is generally smoother than cloth." "Cloth is more expensive than paper." "Cloth washes, paper doesn't." "Cloth is generally thicker than paper." "Paper is made from wood or rags, cloth from threads." "When you crumple up cloth, can smooth it out again, can't paper." "Paper burns more easily than cloth." Give *no* credit for "Paper is white and cloth is white." "You can write on paper, well, you can write on cloth too."

Doubtful: "Apple is *red*. Banana is *long*." If the subject implies the opposite, give credit (this happens often with average adults). It the opposite is not implied, do not give credit. This answer of course does not show as logical a train of thought as when the differences are paired off. Count such as "You can write on paper, and you can sew on cloth" as one difference,—that of use; but count "You can write on paper, and you can't on cloth. You can sew on cloth, but not on paper," as two differences.

Test No. 10 (a):

Full credit(2): "Silverware." "Piece of silver." "Article used to eat with." "Instrument used to eat with." "Long and round at top, cylindrical, use to eat with, and measure by."

Half credit (1): "What you eat out of." "Stir things with." "Silver." "Tin." "You can eat from it. It is silver." "Little lead thing." "Round."

Test No. 10 (b):

Full credit (2): "Piece of furniture." "Wood ware." "Article you sit on." "Four legs and four rounds, back and seat to sit on." "Wooden object."

Half credit (1): "What you sit on." "Have four legs, sit on."

"Wood." "Made of wood, four legs." "Wooden chair with soft cushions." "One kind of chair is different, rocking-chair."

Test No. 10 (c):

Full credit (2): "Animal." "Domestic animal." "Quadruped." "Beast of burden." "Four legs, tail, two eyes, mouth and nose that eats."

Half credit (1): "What you drive." "To ride on a team." "Four legs, ears." "What ploughs and does farm work." "To work with."

Test No. 10 (d):

Full credit (2): "Creature, two legs, and head just like we are." "Human being." "Small child." "Child under three or four years." "Little boy or girl."

Half credit (1): "What you rock." "Crying." "Small and horse is bigger." "Infant." "To creep on floor." "To care for." "Little boy to your mother." "Grows up, gets big all the time." "Nurse looks after the baby." "Belongs to a mother."

General Directions for Grading Test No. 10

Give full credit for classification, or for detailed description. Give half credit for definitions in terms of use or in terms of some attribute of the object as "baby cries," or for words which are practically synonymous as "infant" or for meagre description.

Test No. 14:

Full credit (4): "I went to Boston to see the pretty river and spent most of my money." "I am going to Boston to spend some money on the river." "I lost some money in the river going through Boston." "I went to Boston shopping and had enough money left to go on the Charles river canoeing." "The Boston money works is near a river."

Half credit (2): "I went to Boston to my Father to get some money and I saw someone fall in the river." "Boston is a money-making place and which a river passes near." "To go to Boston you have to have money and you cross the Charles river." "Boston has got a lot of money in the state and the river is out in the ocean." "I am going to Boston to get some money next week; I am going to the river today."

No credit: "I went to Boston one day to spend money." "I go to Boston and bring money and saw a lady fall in the river."

General Rules for Grading Test No. 14

Give full credit for a single sentence containing all three words when sentence does not have verbs connected by "and." If the verbs are connected by "and" give full credit if the connection of the sense is very close. "Boston" may be used as an adjective. The sentence does not have to be true. Give half credit for two separate sentences or two which are loosely connected. If three sentences are given and the three words are used in two of these three, give half credit. A loosely connected sentence in which two of the verbs have different subjects should receive two. Give no credit when only two words are used, even if these two are used in one sentence.

Test No. 15 (a):

Full credit (2): "Look for another train. Wait at depot." "Take electric car." "As what time the next train went." "Take a taxi." "Telephone."

Half credit (1): "Go any place at all." "Have to stay there." "Wait till it comes back." "Take a watch to see how many minutes." "Go home."

No credit: "Run for it." "Hurry." "Go to Boston."

Test No. 15 (b):

Full credit (2): "Forgive them." "Pardon them." "Be nice to them." "Tell them all right and not do it again." "Do to them as you'd like them to do to you." "Make up with them again."

Half credit (1): "Serve them back." "Go up and tell them you feel the same." "Like them." "Say welcome." "Do nothing." "Let them go." "Pay no attention to them."

No credit: "Thank you." "Apologize." "Be sorry to them." "Take it back."

Test No. 15 (c):

Full credit (2): "He don't mean all he says." "Things he did more accountable than what he says. Perhaps what he'd tell you wouldn't be true." "Can tell by their actions and by the way they say it whether they mean it or not." "Might do something he said he wasn't going to." "Can *see* what they do."

Half credit (1): "you can judge people by their actions, can tell by what they do." "Actions speak louder than words." "When he acts it, it shows more gratitude." "He does more than he says."

No credit: "Cause he's disagreeable." "Should judge him in his ways." "See for yourself what he does, can mostly tell when

a person is all right and when they're in wrong." "Supposed to do the right thing." "Shouldn't judge them at all."

Test No. 15 (d):

Full credit (2): "Think they don't mean it, they're in such a temper." "When they did it, they didn't stop to think; when they're not in anger, they plan to do it."

Half credit (1): "When they mean a thing, don't forgive them."

No credit: "Because they apologize and think more of it." "One might be done by accident; one with anger means to do it." "Better to do things without anger."

General Rules for Grading Test No. 15

Give full credit for full, logical answers; and for incomplete answers in some cases where the remainder is implied, as "Can *see* what they do." Give half credit for answers which show some slight grasp on the whole situation.

Test No. 17 (a):

Full credit: "Couldn't swing cane with hands in pockets." "Can't have hands in pocket and swing cane unless he had cane on his arm."

Test No. 17 (b):

Full credit: "If he was dead, taking him to the hospital wouldn't do any good." "If he's killed, can't get well."

Test No. 17 (c):

Full credit: "Trying to make you think he had an extra brother." "Couldn't be a brother to himself." "Only had two."

Test No. 17 (d):

Full credit: "If they can't read the first sentence, they can't read about the blacksmith." "Who was there to tell him to inquire at the blacksmith shop? The post couldn't tell him." "If you couldn't read, how could you read it at all?"

Test No. 17 (e):

Full credit: "If they left the last one off, the one next to the last would be in as much danger." "There would always be a last car."

Test No. 18 (a):

Full credit: "I asked the teacher to correct my paper." "I asked my teacher to correct the paper." "The teacher I asked to correct my paper."

Test No. 18 (b):

Full credit: "A master defends his good dog bravely." "A dog defends his good master bravely, etc."

Test No. 18 (c):

Full credit: "We started for the park at an early hour." "We started early for an hour at the park." "We started for the park at an hour early." "We started early at an hour for the park."

General Directions for Grading Test No. 18

Give full credit for any English sentence containing all the given words and no other words.

Test No. 19 (a):

Full credit: "Take pity on people that ain't got no homes." "Anybody is poor and ain't got no home, the charity helps them along." "To give to the needy." "When you look out for a poor person." "Love for the poor." "Society to take little wanderers and put them in homes."

No credit: 'Give anything away that you have." "People have kind of society and help." "To do anything for anybody for nothing." "Love toward your neighbor." "Helping." "Kindness."

Test No. 19 (b):

Full credit: "Mind the attendant, what they say." "To mind." "Do what you are told."

Test No. 19 (c):

Full credit: "Do right by others." "Treat everybody the same." "To be fair and square with everybody." "To give one person his rights." "Not to let one do what you wouldn't let another do."

No credit: "To do as you'd be done by." "Doing right." "To do right." "The law."

THE ILLUSION OF LEVITATION

Part Two: Clinical Aspects

LYDIARD H. HORTON

Foreword

In this second section it is intended to furnish a more definite picture of the Illusion of Levitation than was presented in the first outline. This is done by a second letter to Dr. Prince, which amplifies the first.

The instances quoted are taken from the case histories of subjects studied by the writer at various institutions in New York City, including the Post Graduate Hospital, the Vanderbilt Clinic, the Physiological Laboratory at P. & S., and the Laboratory of the Department of Psychology at Columbia.

In observations of this kind upon the phases of sleep, it has been a most helpful and steadying circumstance that a student like Morton Prince should have stood ready to give aid and counsel.

Dr. Prince has realized that Abnormal Psychology demands of its devotees that they shall be willing to examine the "improbabilities" of mystical belief as well as to follow the "safe and sane" paths of staid laboratory demonstrations. To emphasize this open-mindedness, to which I pay tribute now, Dr. Prince's own words may be quoted from the correspondence:—

In this connection do not let yourself be hoodooed by any set of "authorities" with whose views your observations are not in accord. Make your own observations and so long as they are accurate and incontestable you have nothing to fear. Be careful only not to force interpretations beyond what the facts warrant.

With due respect both to those who insist upon adventuring into mystical realms, and to those who sedulously abstain therefrom, the natural history of the Illusion of Levitation will be carried through to a physiological analysis in the next instalment.

The statement below is intended to bring out the salient features of the Illusion of Levitation when it is dependent upon phenomena of general relaxation and of sleep.

COLUMBIA UNIVERSITY,
JUNE 6, 1912

My dear Dr. Prince:

As a post-script to my letter of April 17, let me submit a few examples in connection with the process of relaxation that I described.

Lately, having again taken up these experiments I have had my attention called at various times to analogies between the state of relaxation as produced or induced experimentally on the one hand, and on the other to certain peculiar states that occur spontaneously. The analogies are not so much perceived by me as they are suggested to me by those on whom I have experimented or with whom I have talked over the method and its results.[1]

"PROJECTION" OF SENSATIONS

Case 80. A Jewish boy of 19 treated for anxiety neurosis. As a means of helping him to sleep I taught him how to relax, using the usual dialectic method and adding a few exercises for relaxing the eye-muscles. He proved a very good subject and presently experienced the sensations and changes of muscular tonus that I wrote of in the foregoing letter. At the onset of the sensations he said: "I have felt like this before; it used to come over me, this feeling; but I was scared of it and used to try to make it go away." When I explained the matter to him as merely a by-product of rest, he was perfectly willing to continue in the existing state of ease and even seemed to think it wonderfully agreeable. Wishing to impress the sensations upon him I said, more forcibly than accurately: "I want you to remember what you have done now, so that you can rest like this again. Don't forget how you did this." To which the boy responded: "How should I forget how to do this, when it is not me that is doing it?" "Who is doing it?" "I don't know, it just comes of itself."

ALARMING WAVE CHARACTER

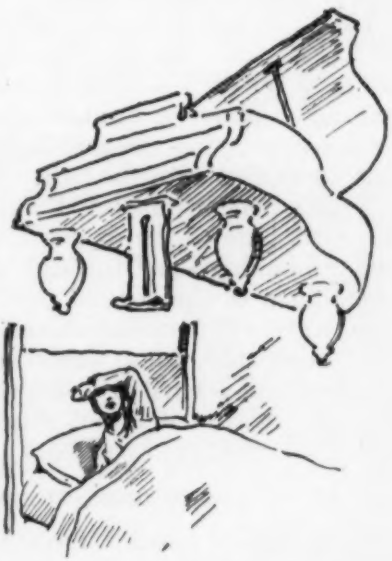
I mention this incident to illustrate the *projec'ed* character of the sensations in question. To be sure the projection in this case is not very marked, but still there is a suggestion as if a foreign influence were exerting itself upon the person. In my earlier experiments this was more marked. One subject who

[1]This method has for years, among my co-workers and subjects, borne the name "Acopic Method"—from the Greek (*alpha* privative and *kopos* fatigue) meaning anti-fatigue. See Century Dictionary.

learned to relax very completely was very much impressed with the sensations in relaxation. He actually argued with me at one time that they must really represent the influx of some force. In another case a man describes his experience in the following terms: "There were waves in the room; it was as if the air were in vibration, and I thought that it seemed to be a force that placed me in communication with a certain patient whom I had asked to relax at the same time. It was the most extraordinary experience I ever had and caused me to be alarmed about continuing this work."

The former was a lawyer of the highest intelligence and the latter was a clergyman, who had done a little psychotherapy and who had tried "absent treatment" in its non-mystical form; I mean encouraging a patient to relax and think thoughts of health, while the healer by appointment was relaxing and meditating in another place.

But let me go on with cases more in point.



EXTERNALIZED ILLUSION OF LEVITATION

Case 95. A psychologist, instructor in one of the big Universities. He had been my subject in experiments conducted by me in 1910. Lately, in discussing the method of relaxation he said: "I meant to tell you about a sort of waking dream that I used to have. I would be lying on the bed and I would see a large heavy piano that we had, floating in the air. This was when I was a kid, ten or eleven. I would imagine I saw this piano getting larger and larger and soaring in the air above me. And I would be afraid that it was going to fall and I would cry out and the family would not know what was the matter with me, for I could not seem to tell them. Presently the piano would stop getting larger and would seem to fall and I would expect that there would be a great crash but it never came. Then the thing would pass away."

SENSATIONS OF SWELLING AND RISING

Case 88. A woman, graduate student in biology. She took a great deal of interest in my experiments and wanted to hear all about the different stages of relaxation, (which is information I do not give to those who are to be my subjects). Although not a subject, she gave me the following description of similar sensations she had had: "I used to feel myself beginning to swell and it would bother me, because I did not know what to make of it. I seemed to get larger and larger as if I would never stop expanding. But presently it would stop and things would become natural again. I have asked my doctor about it, but I have never found anyone who understood it, except one woman who had the same sort of experience. We exchanged notes on the subject. It was very curious and used to come quite often." "Was it pleasant?" "Yes, it was pleasant, except that it was so queer." "Do you have it now?" "No, I have not had it for several years."

Case 101. In my own case on one occasion I dreamed of seeing a golf-ball soaring in the air, and rising in a beautiful lofting curve above a bunker surrounded by water. I seemed to be accompanying the golf-ball in its flight, as if I were in some way identified with the ball. I could see the ball and the changing vista beneath us, but I was not there in *propria persona.* In the next part of the dream I was crudely impersonating a golf-ball propelling itself through a muddy golf course. I omit the symbolism of the second part wishing merely to point out the two degrees of impersonation in the dream. In the first part of the dream the flying sensation or levitation illusion was very marked and seems to account for the partial projection of the illusion, so that it is not exactly I, but rather the golf-ball, to which the flight is ascribed.

THE SENSATIONS BEREFT OF ILLUSION

In earlier cases I have experienced the floating sensation while relaxation was in progress and while perfectly oriented otherwise. Its onset was brought about by a deliberate process of relaxation but without any expectation of the illusion of soaring. The insight thus acquired changed for some time the character of my flying dreams, by robbing them of the illusional element. I would simply feel myself soaring in my sleep, but would not apperceive it as a flight; for I would recognize the true character of the experience and relate it to my waking experi-

ments. The identity between the illusional and the non-illusional levitation phenomena, however, must be unmistakable to anyone who has experienced the several varieties, as I have.

Now let me mention the fact that often the floating sensation is connected with a tingle. I have had it several times in such a way that the tingle resembles the strongest reaction after a shower bath. It has come to me at other times locally as if there were a thready tingle in different parts of the body. I never had paid very much attention to these things nor had taken any careful record. But later two subjects, independently and in almost identical terms described a tingle, as follows.

Case 71. "While you were talking and I was relaxing I felt a sort of twitching or tingling. It seemed to run from under my eye down the side of my face near the nose. I never had this before."

Case 78. "I had a queer sensation. I did not know what to make of it. It was a kind of a prickly sensation just in one place, I thought I would have to scratch it. It was along the thigh as far as the knee. I don't remember ever feeling anything like it before."

VASO-MOTOR FEATURES

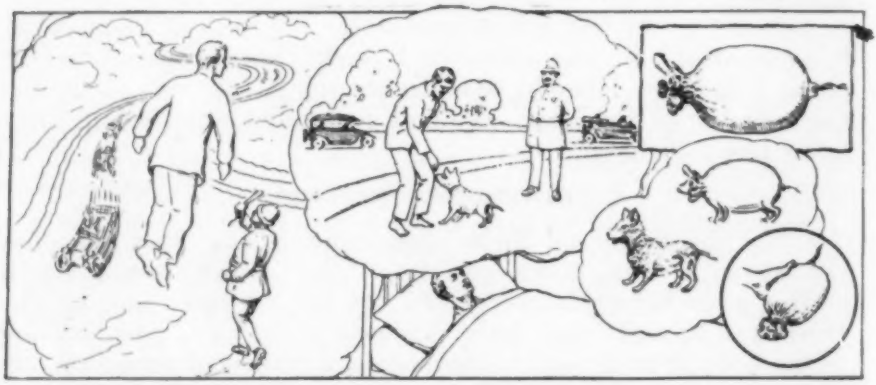
My theory for all these phenomena is that they are connected with vaso-motor activity. The theory seems worth stating even before I have given you all the cases and all the threads of thought that make it appear plausible. The swelling of the body is evidently, to my notion, a projected sensation due to vaso-motor relaxation of skin vessels. The floating sensation is due to the numbness or diffusion of sensation caused by the vaso-motor relaxation plus (and this is more problematical) a more or less real inhibition of the pressure sense. All these elements of explanation are referred to in the letter of April 17.

Now as to the tingle, my own feelings during relaxation indicate that it depends on the rapidity with which the vaso-motor dilatation takes place. In one case, already reported to you, the dilation was so rapid that I felt light in the head and had an illusion of falling. No anxiety attended this phenomenon. From the beginning of the tingling I knew, or thought I knew what was going on; for I had had quite as marked a tingling once before, it having come to me in the earlier instance as my first intimation of the vaso-motor character of the floating sensation. Altho' not prepared for the dizziness which followed the sudden relaxation of the body or skin vaso-motors, its "explanation"

flashed upon me before the illusion of falling got a very strong grip on me. There was no room, it would seem, for me to put any elaborate fancies in between two facts so clearly perceived and coming so closely in connection.

BREEDING GROUNDS OF THE ILLUSION

But suppose similar physiological phenomena occurring in a different psychological setting. It needs no great stretch of the imagination to conceive of cases where experiences of peace and relaxation would be obtained through more or less mystical practices, such as the meditations of the saints, the contemplation of the buddhists, the reading of Science and Health at the bedside and so on. This implies in each case a rather wide ranging of the mind through realms of conjecture and pseudo-



A SECOND EXAMPLE OF LEVITATION IN DREAMS

Dependent as in Former Case upon Vasomotor Changes

This is a faithful, if somewhat labored, picturization of an actual dream known to have been elicited by vasomotor warming of the body surface, in response to cold while the dreamer was in bed; thus it depended upon a reaction of the mechanism that regulates temperature.

The dreamer fails to apperceive correctly (*mal-apperceives*) the corresponding sensations; these being in the main: 1. Changes of pressure from the suffusion of the blood through skin and muscles, in addition to actual pulsations. 2. Joint and muscle sensations of the dreamer's actual movements, automatically initiated in pursuit of comfort (*warmth*).

The apperceptive errors belong in the class of "trial apperceptions," as explained by the writer in the Journal of Abnormal Psychology, vols. for 1915-16 and 1916-17. (See also critical review of the theory in Psychol. Bulletin for January, 1918.)

The above statements apply exactly to the previous example, in which the dreamer ends by drawing up his legs under him and obtains an illusion of levitating in that position. In the present instance the final heat-seeking movement leads to the passing of the foot over the varied surfaces of a hot-water bottle, made of rubber and sheathed in a furry cloth bag. The resulting spatial and tactual impressions are thereupon "transposed" from the sensory field of the foot to the psycho-sensory field of the hand—*a mis-reading of "local sign."*

The initial sense of vasomotion gives rise to the illusion of floating like a balloon or inflated dummy, which swings in the way of the traffic, obliging the rapid vehicles to swerve sharply in their course along the already undulating parkway.

Continued on Page 127

science in which anyone can find much material to enrich and overlay the sensation I have described, covering it almost out of semblance to the original. Does not Ethel Puffer in her chapter on the Esthetic Repose call attention to just such illusory accretions? It remains for us to divine the underlying physiological facts. "My soul swims in the Being of God as a fish in water," says the humble Beguine, Mechthild. Again the theosophist feels his astral body floating away and visiting over the world. A book could be written full of instances of this kind that would show a perfect series of such illusions, all of them conceivably built around the actual sensations that I have encountered in their bare state among my subjects.

Here is a case in point, which has never been explained and which is quoted in Professor Muensterberg's Psychotherapy. I think that you will concede the close connection of this case with the cases I have cited in this post-script and in my original letter.

"My condition was horrible in the extreme. I had consumption of the lungs and other supposedly fatal troubles, complicated by wrecked nerves. (Here follows the lady's account of the visits of a Christian Science healer) . . . At noon she left me to go to her home for lunch.

RECONSTITUTION (*Experience as related*)

Cf. "Mid-State" of attention.

I was pondering seriously on her reiterated 'God is love and fills the universe and there is nothing beside Him,' when I suddenly had a sensation of being lifted up or rising slowly and becoming lighter in body.

Sudden dilation of the vaso-motors.

A rush of power that I have no way of describing to you filled me. I seemed to be a tremendous dynamo

The inhibition of pressure sense.

in the air several inches above the ground and still ascending.

A particular diffusion of sensation of which more anon.

When I noticed everything around me becoming prismatic and more or less translucent,

RECONSTITUTION

Ligh'ness again.

I could have walked on water without sinking, and I had a distinct understanding that matter seemed to be disintegrating and dissolving around me. I was

Alarm.

frightened but self-conscious and quiet. I remained in this state for about three hours, my consciousness seeming to have reached

The swelling sensations.

ALMOST COSMIC GREATNESS.

The altruistic "desire to show how" of the typical Flying Dream turned to therapeutic account.

I could have cured, I felt, any human ill, was filled with an absorbing altruistic desire to help suffering. It was tremendous and totally foreign to my every-day attitude. At the end of the day, towards twilight, I became wearied of the TREMENDOUS THROBBING and exalted state in which I still remained and gave utterance to the thought aloud. Almost before I had formulated it the condition left me, and like the sudden dropping of a weight, I struck the ground, the same dull, ordinary person of every-day experience, but with the vast difference of perfect health, radiant and lasting to the present writing. My father like myself is baffled and wondering. We are both pretty hard skeptics. I want the truth, whether it be terrible or otherwise. I am profoundly grateful to the Christian Scientist, if I regained my health through her ministrations, but I have not so far been able to label myself and rise in their church services to tell what has been done on me. The performance repels me as crude and rather bad taste. I swear to you on my honor as an American woman and mother that what I have written you is true, absolutely. If you can give me any light or if my experience may perchance give you a helping ray, my renewed lease on life may have had some purpose after all, which I have questioned in my cynical moods."

Vasomotor relaxation and consequently greater beat of the pulses.

The "return o earth."

Was this experience healthful simply because it served to remove inhibitions existing in the Function of Repose?

"The unprejudiced psychotherapist, adds Professor Muensterberg, will be perfectly able to find room for such cures and, if it is the duty of the scientific physician to make use of every natural energy in the interest of the patient's health, he has no right to neglect the overwhelming powers of the apparently mysterious states." (p. 317)

IMPEDIMENTS TO A SCIENCE OF REST

My object in writing of my experiments is to bring within the pale of science a number of "natural energies" that are at present the possession of more or less confused mystics. The association of the rest-states with mystical practices is the greatest source of difficulty that I find in presenting the facts. I am hoping that if these facts are published under your auspices this difficulty may disappear.

Yours very sincerely,

L. H.

(*To be Concluded*)

Continued from Page 124

The various items are fanciful reproductions of memories of the park at Morningside Heights. The emotional tone of the Irish policeman is anger, which gives way to complacency when the dreamer, now deflated, sets foot to the ground (contact with hot-water bottle) and pets the dog's head. The policeman is obviously an externalization of the dreamer himself—an *alter ego*.

Such is the stuff that dreams are made of.

The analysis, or rather *inventory*, cannot be completed here; but this fragment may serve as an earnest of the type of explanation that is to follow. The physiological treatment ("*re-constitution*") here sketched should serve, in respect of Flying Dreams at least, to give a quietus to the rather wild guesses of the Freudian school. Havelock Ellis has gone farthest in the right direction by recognizing "Aviation in Dreams" to be due to physiological mechanisms operating in sleep, rather than to wish-fulfilments. The detailed consideration of these mechanisms will form the subject of the next instalment.

Consult Havelock Ellis, "The World of Dreams," 1911, Houghton Mifflin & Company; note especially the sixth chapter, which appeared in the Atlantic Monthly, 1910.

REVIEWS

THE PSYCHOLOGY OF WAR. By J. T. MacCurdy, M. D., London. William Heinemann, 1917. Pp. 68.

Every one admits that war is a terrible—though not an absolutely unmitigated—evil, and the writer of this excellent and eminently pertinent little book asserts, with good reason, that the first step toward its elimination is a thorough and comprehensive understanding of the causes that produce it. So far as these causes are political and economic in their nature, the discussion of them belongs elsewhere, and a vast amount has been written with regard to them. What is not appreciated in its true bearings, is the fact that some of the most effective of the war-producing influences lie deep in certain tendencies of human nature.

War, as he points out, "is not an isolated phenomenon, but the product of the best and worst in human kind. It would be a sad day for the race if man lost his hardihood and ideas of loyalty merely for the sake of peace. His *psyche* must be transformed, not syncopated. This change can only come from within, and only when he has learned his essential nature. The ambition of the psychologist—a fundamentally practical man—is, therefore, to set men thinking before they act."

It may be stated as a proposition to which many modern students of clinical psychology will give credence, that the phenomena of war, or—to be more accurate—the phenomena of peace and war (since these are states which can only be adequately studied as in close relation to each other)—are analogous to the phenomena of the psychoses; and, as a psychosis, war is to be investigated in the light of the modern doctrines with regard to the nature of the disorders classified broadly under that term.

To go a step further in the presentation of this view, it may be said, first, that war, regarded as a breaking away from ordinary social obligations, implies the coming into life and action of primitive, elemental motives, by which every one is swayed to a greater or less degree, but of which their possessors are for the most part unconscious. These unconscious motives have been very fruitfully studied during the past few decades, from two standpoints; namely, first, that standpoint which the "psychoanalytic movement" has done so much to render clear; and, next, from the standpoint of those who regard men, not as isolated human beings coming together incidentally to form

societies, but as persons who from their very nature, and, as it were, aboriginally and innately, are gregarious in their instincts.

The leading spirit in the first of these movements has been, unquestionably, Sigmund Freud, whose work is supplemented, with reference to war as in other respects, by Ernest Jones, from whose essay, published in 1916, MacCurdy liberally quotes.

The investigator whom MacCurdy mainly cites with reference to the second movement is the surgeon and psychologist, Wilfred Trotter, whose papers and books treating of the "herd instinct" have been so largely quoted. It seems to the reviewer fair to say that the names of other distinguished men should be referred to in this latter connection, and especially those of two writers—Josiah Royce, the philosopher and psychologist of Harvard University, and Levy-Bruhl, who has developed this thesis of the primary gregariousness of human beings quite elaborately in his admirable study of the mental operations of the primitive races.*

War, looked at from the psychotic standpoint here presented, is, the writer thinks, a crisis for which days and years of peace gradually prepare, by tightening powerful springs which represent repressed primitive instincts and which are destined eventually to break loose from forces that have controlled them. And this oscillation is likely to go on, unless, indeed, it is possible, in the meantime, to enlist the consciousness and reason of men in the task of grasping and supervising the hidden forces of their natures; or unless some adequate substitutes for war are found which will provide an outlet for the powers and spirit of adventure of large groups of men. Neither of the two sets of influences now brought to bear on the side of peace,—namely, militarism on the one hand, and pacificism, on the other,—is likely, the writer thinks, to accomplish very much. The representatives of each of these tendencies unite in trying "to solve a delicate situation by a *tour de force*. The militarist sneers at diplomacy of any kind and seeks to adjust every difference by the sword, while the pacifist would change human nature by fiat."

The fact that in war men fall back upon their primitive instincts is obvious and well known. But less familiar is the further fact that every child brings into the world a greater or less amount of instinct for violence which in war is bound to show itself as a veritable bloodlust. This quality is very unequally developed and unequally converted into forces that work in behalf of civilization; but unless it is present or can be developed in some measure, the actual business of war, at least for the common soldier, is certain to become soon too loathsome for endurance.

Strangely enough, it is due to the peculiar mode of working out of man's gregariousness that the powerful inhibitions which society has come, gradually, to impose on this instinct for violence, on the part of the individual, are removed in case of war. For gregariousness makes men form nations, but nations are invariably rivals, and this rivalry is liable to become so intense that a trivial cause brings a new set of forces into play. Then the blood-lust comes to the front. The foreigner is not primarily hated, or even disliked, as such; often quite the contrary is true. But the moment war breaks out the foreigner "becomes a scapegoat for his race: he must be killed or injured in any possible way. If there is to be real war it is obvious that this second phase has to develop, for unless animosity of the race becomes individual, it would be impossible for a civilized man to deal a lethal blow, restrained as he is by the inhibitions of generations. Moreoever, these inhibitions must be lifted to the point where killing gives satisfaction, else there will be a woeful lack of the enthusiasm necessary to outweigh personal sacrifice and sustain the war."

The marvelous scene which the author quotes from Shakespeare's "Julius Caesar," where Cinna becomes the object of mob fury because of his name, and although he is obviously the wrong person, is cited as a case in point.

MacCurdy quotes at considerable length from Freud's paper on "The Disillusionment of War," which has for its main thesis the doctrine that the primitive egoistic tendencies of every individual are the most "real" part of him, and that society is to be best understood by studying the metamorphoses which these instincts undergo.

These views of Freud are developed so concisely that it would be difficult to do them justice without citations of unreasonable length and I pass on to the point at which MacCurdy's views differ from, Freud's. This is especially with reference to the relation of men to the social groups in which they live, and of these of different groups among themselves. Here, he thinks, Freud's individualistic studies are inadequate, and he quotes him as saying that he cannot readily explain "the hate existing between nations," and that "it seems as if the aggregation of men simply multiplied their primitive impulses."

"It is evident from the above that Freud views the atrocities of war as more natural than the civilized behaviour of man . . . This is equivalent to saying that the mystery to be solved is the behaviour of peace rather than the incidents of war."

Jones's attitude is similar to Freud's, and carries his argument in various respects a little further. Amongst other interesting propo-

sitions "he (Jones) deprecates any attempts to abolish war by forcible repression of primitive instincts . . . He suggests that it may be possible that the sublimating capacity of man is now at its greatest height . . . What he recommends is a more intelligent treatment of primitive instincts, the substitution of open-eyed study and control of social problems rather than blind legal negations which tend to increase social unrest."

"On the whole, therefore, we can sum up Jones' contribution as an effort to establish the violent, primitive instincts of man, usually unconscious, as an important, if not the primary, cause of war."

But Jones also, as MacCurdy justly says, fails to study adequately, or even mention, "the phenomenon of international hostility, the jealousy which is exhibited in times of peace." And it is with this important matter that the second portion of the essay deals.

"International rivalry is, apparently, never friendly; in fact, it seems to be invariably characterized by jealousy, often by bitterness." And no solutions of the difficulty are offered, except that it is "silly," or inevitable and of practical utility. In fact, a better solution is to be found through the study of the instinctive gregariousness of men and the constant interplay, as source of motive, between the dictates of this gregariousness and men's relatively individualistic opinions and desires.

> "There is but one psychologist who has seen the potentiality of man's gregariousness. This is Wilfred Trotter."

This writer, who is by profession an English surgeon, attempts to explain many of the anomalies of man's conduct by pointing out that he has an instinct "to react with the herd" and is relatively "deaf to the voice of one without the herd."

> "There are three great types of development in herd-life: that of the animals who unite for aggression, as do wolves; that of the species like sheep, whose cohesion gives protection; and finally, the highest degree of gregariousness, which he terms the socialized type, exemplified in the society of ants, or better still by bees."

Trotter's first papers on this subject appeared in 1908, and his later book,* valuable as it is, is marred, MacCurdy thinks, by the writer's strong prejudice against everything which is German. Nevertheless, the main propositions appear to him valuable and sound; and so far from contradicting the conclusions of psychoanalysis, they supplement them in an important way.

*Science History of the Universe—Vol. VIII, Mathematics—Section on Mathematical Applications by Dr. Franz Bellinger—Current Literature Publishing Co., New York, 1909.

"One may say that psychoanalysis deals with individualistic motivation, while herd instinct is a study of social instinct."

Repression, he believes, is only one of the tasks of the instincttive repressing force by which it is brought about.

"The other task of this instinctive force is to augment the individualistic unconscious instinct when it is symbolized in a form that is socially acceptable. This is the essence of the dynamic structure of 'sublimation.'"

It would be unnecessary to analyze further the opinions which MacCurdy gives of the psychological trends represented by the work of these able men. His own contribution consists in the amplification of Trotter's views with reference to the social consciousness and its significance. As for the real dynamic value of the "sublimation" which in the eyes of Freud has been hitherto regarded as a somewhat passive or negative outcome, or by-product, of individual instincts acted on by repression, MacCurdy's views are such as have long been favored by the reviewer, and have been called attention to by him in different articles.

The reviewer would only urge that the argument presented might well be carried further. What are, in reality, these social, "gregarious," tendencies which Trotter regards as aboriginal and instinctive? What is their origin, their "sanction" and their scope? As one studies evolution, one finds, or seems to find, first, the individual, then, "society." But when "society" has beome developed it takes a place even superior to that taken by its separate members.

Going further on this path (although in fact it is not the only path that one can follow) one finds individuals who transcend, in their development, even society,—in the same sense that a sentiment, say of "loyalty," transcends any group of men in whom the sentiment is exemplified. Is there not, then, a social "essence," or "generic energy," to which we owe a greater allegiance than even to society itself, and is not this what is, or should be, meant by "religion?" This brings in a problem of metaphysics, but the reviewer would urge that without a reference to metaphysics the full bearing, even of "physics" cannot be appreciated.

This argument cannot be properly developed here, and the practical point for the present moment, is, after all, as MacCurdy says, not so much the question, Do we want to abolish war, as the question, Do we want nations? For hitherto no ground of sufficient cohesiveness except war has been found that is adequate to weld together the units of which any large modern nation is composed.

"In the meantime, psychology can offer one ray of hope. Instincts triumph over reason, but largely because instincts act unconsciously. When man is so educated as to know himself and recognize the forces that are within him, he will be in a position to see the way his footsteps lead, and change his path—if he wills."

This interesting and hopeful doctrine rests, however, upon the supposition that reason must be regarded as supreme,—and one may justly ask is reason supreme? Must it not itself relate to what can be only classified as a moral intuition? And behind "society" as a physical group, is there not an ideal society which is rather to be classified as an "energy," which underlies, at once, the universe and man, and provides a bond of union between them, while it offers a goal for man's imagination and his constructive effort? Are we solely products of our evolutionary history taken in the usual sense? The reviewer thinks not and believes that just as society has inevitably a hold on us,—*i. e.*, just as gregariousness may be regarded as an instinct, —so, too, in view of the fact that our capacity for forming ideals is just as definite a part of us as any other, it may be said that an ideal society—*i. e.*, our ideals of moral right and wrong—can also make its claims upon us and inevitably does so.

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VOCATIONAL PSYCHOLOGY, ITS PROBLEMS AND METHODS. By H. L. Hollingworth. With a Chapter on the Vocational Aptitudes of Women by Leta Stetter Hollingworth. New York: D. Appleton & Company, 1917.

The author outlines the history of the various vocational efforts, beginning with those of primitive magic, and shows that the practices of medieval clairvoyance are far from extinct at the present time. The first scientific attempts at vocational guidance and selection are dated from the search for phrenological and physiognomic principles of diagnosing individuals, and considerable effort is devoted to their refutation on the basis of empirical and statistically treated data. The rapid progress in experimental psychology has led to the application of mental tests, the elaboration of graded intelligence scales, the establishment of norms of subnormality and normality, and the development of refined methods of mathematical treatment of experimental data, to the description of which the main part of the book is devoted.

One of the first methodical attempts to differentiate the various vocations from one another on the basis of special aptitudes and

characteristics is the method of the psychograph, which may be applied to the individual as well as to a vocation. The former is illustrated by a lengthy reference to E. Toulouse, examination of Zola, Dalou, and Henri Poincare, the latter by an instance from C. E. Seashore's study of professional musicians. The more specialized vocational tests and methods are divided into four groups, according as they employ the vocational miniature, the vocational sampling, the vocational analogy, and the haphazard substitution or selection of tests on the basis of empirically determined correlations of success or failure in certain tests with success or failure in certain occupations. A more recently developed method involves "self-analysis" and judgments or "consensus of opinion" of one's associates. Here the author offers some valuable original contributions of an experimental nature. The method consists, briefly, in having a number of closely associated individuals rank all members of the group, including themselves, in the order in which they are estimated to manifest higher or lower degrees of certain mental and moral characteristics. The scholastic career of an individual, if properly diagnosed and interpreted, may also offer some valuable facts as to his aptitudes, interests, and limits of further development. In the discussion of the problem: to what extent intercorrelations between mental tests revealed by preliminary trials are modified by continued practice in the tests, the author again has to offer some extensive experimental results of his own which lead him to distinguish sharply between temporary proficiency and ultimate capacity, and to propose a new program for future work in vocational psychology.

In the chapter on "The Vocational Aptitudes of Women," by Leta Stetter Hollingworth, this author establishes the fact that "scientific experiment has revealed no sex-difference in the original nature of intellect that would imply a necessary differentiation of vocations on the ground of sex." She also points out that "there exist no scientific data to show (1) differences in average intellect; (2) differences in mental variability; (3) special causes of intellectual inefficiency affecting one sex but not the other; (4) differences in affective or instinctive equipment, implying a natural division of labor."

The book closes with an Appendix containing a classified bibliography and a large variety of test-materials, sample blanks, standards and norms for various ages and activities, and forms for recording data. While the treatment of the subject-matter is concise, authentic, and conservative, the style is fluent and non-technical, and the book may

be highly recommended to all who seek a trustworthy and stimulating account of the recent progress in vocational psychology.

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The Unmarried Mother: A Study of Five Hundred Cases. By Percy Gamble Kammerer, St. Stephen's House, Boston. With an Introduction by William Healy, M. D., Judge Baker Foundation, Boston. Boston: Little, Brown & Co., 1918, 22x15 c. m.; pp. XV, 342. $3.00 net.

"The Unmarried Mother" is the third volume in the series of Criminal Science Monographs, authorized by the American Institute of Criminal Law and Criminology, (the other two being Healy: "Pathological Lying, Accusation, and Swindling," and Gluck: "Studies in Forensic Psychiatry.") These monographs represent a phase of "abnormal psychology" never as yet too much, or even adequately, considered by medically trained psychologists. The question of the unmarried mother and her child, for example, is one of the most important social problems of the present day, and assuredly needs attention from those whose opinion might have weight—if expressed in the fitting places.

"Branded," as the advertisement says, "since civilization began, the illegitimate child is handicapped in life, even before birth; its chances of normal development are minimized, even its physical well-being is menaced, and it is obliged to bear an unfair burden. It is in the belief that enlightened public opinion may see fit to modify the community attitude towards the unmarried mother and her child that Mr. Kammerer has prepared his study of the situation. The statistics presented show only too plainly the futility of the present method of treating such cases, and the necessity of a different viewpoint from the average if this social evil is to be remedied." And Doctor Healy hits the key-note not of this book only, but of a pressing need of occidental society still suffering and in so many ways from the narrowness and the ignorance of the "Middle" Age:—"To prevent the disastrous stigmatization of the so-called illegitimate child or to prevent in the fullest possible measure this anomalous social phenomenon of illegitimacy, when nature and civilization are clearly at outs, we must inevitably turn to the deeper consideration of causes." The next particular decade or so, especially, when at last this war-weary world has crushed back the drive "on the road to yesterday," will value babies as even babies seldom so far have been valued; and we shall see in regard to legitimacy, perhaps even here in America, who knows?

we shall see—what we shall see. One thing modern equity and balanced kindness of common-sense certainly *must* attain:—the removal of reproach even in thought from the burden of the busy "stork;" for this child no more than the proudest infant of us all, asked to be crowded out into the doubtfully happy world. Whosesoever the fault, it is not his, and this book will forcibly and scientifically remind the intelligent public of that needful fact.

Sixteen of the eighteen chapters discuss respectively these topics following: working methods; bad environment; bad companions; recreational disadvantages; educational disadvantages; bad home conditions; early sex experience; heredity; abnormal physical condition; sexual suggestibility; sexually suggestible by one individual; abnormal sexualism; mental conflict; assault, incest, and rape; mental abnormality; and the unmarried mother in various communities. There are conclusions, statistics, and legislational suggestions in abundance, and sixty-one literature-references of much value.

Probably between 30 and 40 per cent of the 500 cases summarized or studied (69) in this book has some kind or another of mental defect, thinks the author, and on this account, if on no other many "will see in illegitimacy but another instance of social maladaptation," and "will realize that the solution of the problem lies through the individual." Give the great and basal sex-question its necessary spiritual setting and make it common knowledge. And see that the children born evolve into good citizens.

Mr. Kammerer's book lays due stress on the subconscious determinants of behavior and for this reason too is of much interest to the numerous readers of this JOURNAL. Doctor William Healy's introduction is noteworthy.

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